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Health and Safety Plan
for
RCRA Facility Investigation, Natural Attenuation Evaluation and Supplemental Sampling
at
Sites 6A, 9 and Southern Area (CTO 0270)
and
Site 7 (CTO 0189)

Naval Weapons Industrial Reserve Plant
Calverton, New York

Northern Division
Naval Facilities Engineering Command
Contract No. N62467-90-D-1298
Contract Task Orders 0189-0270

February, 2000

TETRA TECH NUS, INC.

HEALTH AND SAFETY PLAN
FOR
RCRA FACILITY INVESTIGATION, NATURAL ATTENUATION EVALUATION AND SUPPLEMENTAL SAMPLING
AT
SITES 6A, 9 AND SOUTHERN AREA (CTO 0270)
AND
SITES 7 (CTO 0189)

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT

Submitted to:
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mall Stop #82
Lester, Pennsylvania 19113-2090

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) addresses investigation activities to be conducted at the Naval Weapons Industrial Reserve Plant, located in Calverton, New York as part of Contract Task Order (CTO) 0189 & 0270. Specifically, this HASP addresses the performance of a RCRA Facility Investigation (RFI), Natural Attenuation Sampling, and Supplemental Sampling. The sites to be investigated are as follows.

Site 6A – Fuel Calibration Area (CTO 0270)
Southern Area (CTO 0270)
Site 7 – Fuel Depot (CTO 0189)
Site 9 – Electronic Counter Measures (ECM) Area (CTO 0270)

This HASP is being prepared for NWIRP Calverton as part of an overall effort conducted under Comprehensive Long-Term Environmental Action Navy CLEAN) administered through the U.S. Navy Northern Division Naval Facilities Engineering Command (NAVFAC), as defined under Contract Number N62467-90-D-1298. In addition to the HASP, a copy of the Tetra Tech NUS, Inc. (TtNUS) Environmental Health and Safety Guidance Manual must be present at the site during the performance of site activities. The Guidance Manual provides supporting information pertaining to the HASP, as well as TtNUS Standard Operating Procedures (SOP's). Both documents must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.120.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site. The HASP will be modified if new information becomes available. All changes to the HASP will be made by the Project Health & Safety Officer (PHSO) and approved by the TtNUS CLEAN Health and Safety Manager (HSM) and the Project Manager (PM). The PM will notify affected personnel of all changes.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility for all onsite health and safety. These persons will be the primary points of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for onsite activities.

- The TtNUS PM is responsible for the overall direction of health and safety for this project.

- The PHSO is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:

  i. Providing information regarding site contaminants and physical hazards associated with the site.
  ii. Establishing air monitoring and decontamination procedures.
  iii. Assigning personal protective equipment based on task and potential hazards.
  iv. Determining emergency response procedures and emergency contacts.
  v. Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
  vi. Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
  vii. Modifing this HASP, as it becomes necessary.

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The SSO supports site activities by advising the FOL on all aspects of health and safety on site. These duties may include:

  i. Coordinates all health and safety activities with the FOL.
  ii. Selects, applies, inspects, and maintains personal protective equipment.
  iii. Establishes work zones and control points in areas of operation.
  iv. Implements air monitoring program for onsite activities.
  v. Verifies training and medical clearance of onsite personnel status in relation to site activities.
  vi. Implements Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
  vii. Coordinates emergency services.
  viii. Provides site-specific training for all onsite personnel.
  ix. Investigates all accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
  x. Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.

- Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TtNUS CLEAN HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NWIRP the FOL may also be responsible for SSO duties. This action will be performed only as credentials, experience, and availability permits.

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: NWIRP Calverton

Address: Suffolk County, New York

Remedial Project Manager: Jim Colter

Phone Number: (610) 595-0567 ext. 163

Site Contact: Al Taormina

Phone Number: (516) 346-0344

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 4.0), including soil boring (drilling), monitoring well installation, multi-media sampling, and other related activities.

Proposed Dates of Work: March, 2000 until project completion

Project Team:

TtNUS Personnel:	**Discipline/Tasks Assigned:**
David D. Brayack, P.E.	Project Manager (PM)
Tim Evans, P.G	Field Operations Leader (FOL)
Matthew M. Soltis, CIH, CSP	CLEAN Health and Safety Manager (HSM)
Delwyn E. Kubeldis, CIH, CSP	Project Health and Safety Officer (PHSO)
TBD	Site Safety Officer (SSO)
Non-TtNUS Personnel	**Affiliation/Discipline/Tasks Assigned**
TBD	Drilling Subcontractor(s)

Prepared By: James K. Laffey

TBD - To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section is part of a preplanning effort to direct and guide field personnel in the event of an emergency. In the event of onsite emergencies that cannot be handled by onsite personnel, they will be evacuated to a safe place of refuge, and the appropriate emergency response agencies will be notified. Because a majority of potential emergency situations will require assistance from outside emergency responders, TtNUS and subcontractor personnel will not provide emergency response support for significant emergency events beyond responding to easily controlled minor incidents. The emergency response agencies listed in this plan are capable of providing the most effective response and are designated as the primary responders. These agencies are located within a reasonable distance from the area of operations, a factor that ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

TtNUS will, through necessary services, include initial response measures for incidents such as:

- Initial fire-fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

2.2 PRE-EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, injury or illness resulting from exposure to chemical or physical hazards or fire are the most probable emergencies that can be encountered during site activities. To minimize and eliminate these potential emergency situations, pre-emergency planning activities associated with this project include the following. The SSO and/or the FOL are responsible for:

- Coordinating response actions with local municipal Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.
- Establishing and maintaining information at the project staging area (Support Zone) for easy access in the event of an emergency. This information includes the following:
  - Chemical Inventory (for substances used onsite), with Material Safety Data Sheets.
  - Onsite personnel medical records (medical data sheets).

- A logbook identifying personnel onsite each day.
- Emergency notification phone numbers in all site vehicles

- Identifying a chain or command for emergency action.
- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

It is the responsibility of the TtNUS FOL to ensure that this information is available and present at the site.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by visual observation. A clear knowledge of the signs and symptoms of overexposure to contaminants of concern may alert personnel of the potential hazards concerning themselves or their fellow workers. These potential hazards, the activities with which they have been associated, and the recommended control methods are discussed in detail in Sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate any conditions that may predispose site personnel or properties to an emergency. The FOL and the SSO will constitute the site evaluation committee responsible for these periodic surveys. Site surveys will be conducted at least once a week during the initiation of this effort.

The above actions will provide early recognition for potential emergency situations. Should an incident take place, TtNUS will take defensive and offensive measures to control these situations. However, if the FOL and/or the SSO determine that an incident has progressed to a serious emergency situation, TtNUS will withdraw, and notify the appropriate response agencies.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual, applicable OSHA regulations, and through periodic site surveys of work areas.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, all personnel will immediately stop activities and report to the FOL at the place of safe refuge. Safe places of refuge will be determined prior to commencement of site activities and will be conveyed to personnel as part of the daily safety meeting conducted each morning. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the TtNUS FOL. The FOL or the SSO will take a head count at this location to confirm the location of all site personnel. The site logbook will be used to take the head count. Places of refuge will ideally be selected which offer a point for communication purposes should this be required.

2.5 EVACUATION ROUTES AND PROCEDURES

Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services, should they be needed.

Evacuation procedures will be discussed prior to the initiation of any work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) will influence the designation of evacuation routes. As a result, assembly points at NWIRP will be selected, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since TtNUS personnel will not always be working in the proximity of each other, hand signals, voice commands, air horns, and two-way radios will comprise the mechanisms to alert site personnel of an emergency.

If an incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) verbally, by air horn, or using two-way radios.
- Evacuate non-essential personnel.
- Initiate incipient response procedures.
- Describe to the FOL (who will serve as the Incident Commander) what has occurred in as much detail as possible.

In the event that site personnel cannot control the incident through offensive and/or defensive measures, the FOL and/or the SSO will enact emergency notification procedure to secure additional outside assistance in the following manner:

- Contact 911 to report the incident (see Table 2-1). Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

If an incident occurs at NWIRP outside of designated operating areas impacting field personnel, the following procedures are to be initiated:

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns, or two-way radio.
- Call Navy On-Site Representative
- Proceed to the assembly points as directed by NWIRP personnel.

2.7 EMERGENCY CONTACTS

Prior to initiating field activities, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted where it is readily available to all site personnel. Facility maps should also be posted showing potential evacuation routes and designated meeting areas.

TABLE 2-1
EMERGENCY CONTACTS
NWIRP CALVERTON

AGENCY	TELEPHONE
EMERGENCY (Police, Fire, and Ambulance Services)	**911**
Riverhead Police	(631) 797-4500
Manorville Fire Department (Emergency) (Business)	(631) 924-5252 (631) 868-6614
Central Suffolk Hospital in Riverhead	(631) 548-6000
Poison Control	(516) 542-2323
NWIRP Calverton Point of Contact Al Taormina	(516) 346-0344
Chemtrec National Response Center	(800) 424-9300 (800) 424-8802
Tetra Tech NUS, Pittsburgh Office	(412) 921-7090
Project Manager David D. Brayack, P.E.	(412) 921-8375
CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health & Safety Officer Delwyn E. Kubeldis, CIH, CSP	(412) 921-8529
Navy Remedial Project Manager (RPM) Jim Colter	(610) 595-0567 ext. 163

2.8 EMERGENCY ROUTE TO HOSPITAL

Central Suffolk Hospital
1300 Roanoke Avenue
Riverhead, New York 11901

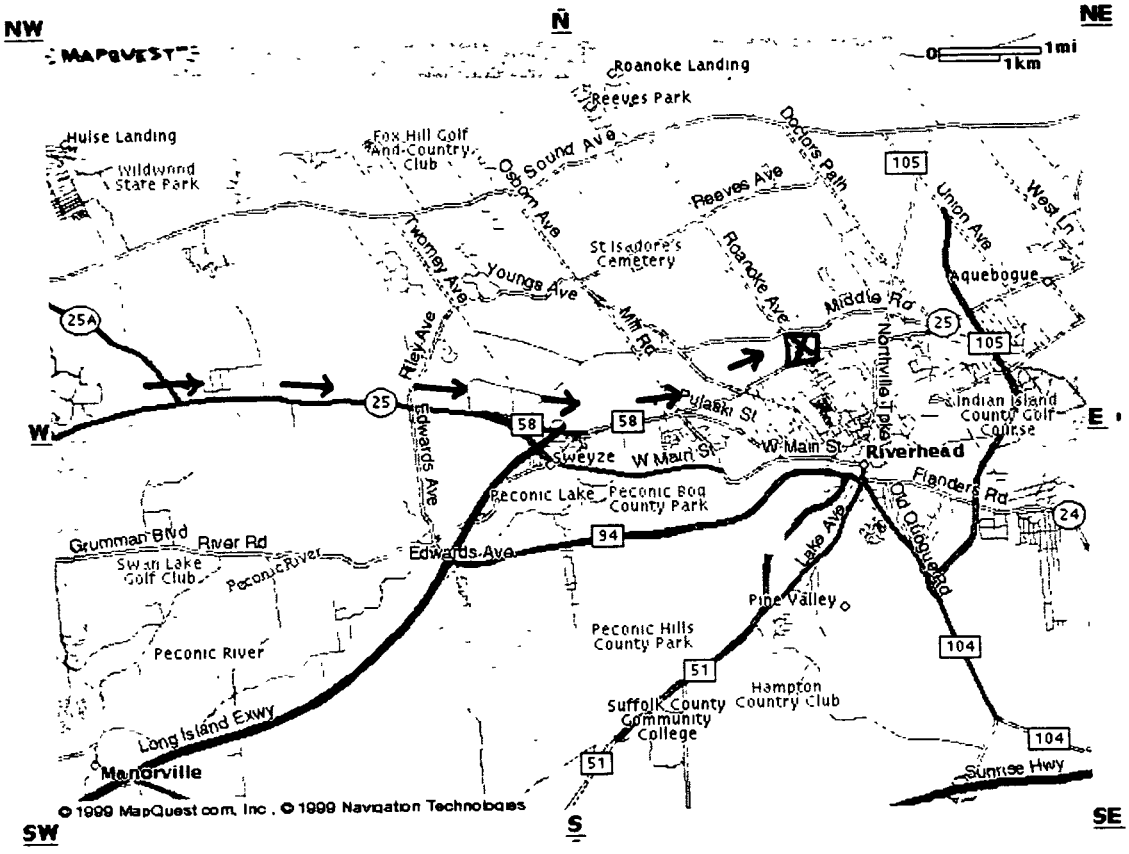
Directions to the Central Suffolk Hospital:

Proceed to the north gate and turn right traveling east on Route 25 (Middle County Road). Route 25 turns into Route 58. Proceed to traffic circle. The hospital is on the left and is approximately 10 minutes away from the site.

See Figure 2-1 for map to Central Suffolk Hospital.

FIGURE 2-1

Route to Central Suffolk Hospital



2.9 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will not be performed if the incident warrants immediate evacuation. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.**

2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident. Also, as soon as possible Navy Contact Jim Colter must be informed of any incident or accident that requires medical attention.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

FIGURE 2-2
EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations.

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 enter Extension 109, or follow the voice prompt for after hours and weekend notification, and be prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

WorkCare will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)
WORKCARE

POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. **Exposing Agent**
Name of Product or Chemicals (if known):_____
_____
Characteristics (if the name is not known)
Solid Liquid Gas Fume Mist Vapor

II. **Dose Determinants**
What was individual doing?_____
How long did individual work in area before signs/symptoms developed? _____
Was protective gear being used? If yes, what was the PPE? _____
Was their skin contact? _____
Was the exposing agent inhaled?_____
Were other persons exposed? If yes, did they experience symptoms? _____

III. **Signs and Symptoms** (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. **Present Status of Symptoms** (check off appropriate symptoms)
Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)
Improved: _____ Worsened: _____ Remained Unchanged: _____

V. **Treatment of Symptoms** (check off appropriate response)
None: _____ Self-Medicated: _____ Physician Treated: _____

3.0 SITE BACKGROUND

The NWIRP Calverton is located approximately 70 miles east of New York City on the eastern end of Long Island, in Suffolk County, New York. It covers almost 6,000 acres, with a portion in the town of Riverhead and the remaining land in Brookhaven.

NWIRP Calverton has been owned by the United States Navy since the early 1950's, at which time the land was purchased from a number of private owners. It was used for the development, assembly, testing, refitting, and retrofitting of Naval combat aircraft. The facility was expanded in 1958 through additional purchases of privately-owned land. Northrop Grumman Corporation (previously Grumman Corporation) leased the land and was the sole operator of the facility from its construction until February 1996. In 1996, the land was returned to the United States Navy. In 1998, the majority of the facility was transferred to the Town of Riverhead.

The majority of industrial activity at the facility was confined to the developed area in the center and south center of the facility, between the two runways. Industrial activities at the facility were related to the manufacturing and assembly of aircraft and aircraft components. Operations which resulted in hazardous waste generation, included but were not limited to, metal finishing processes such as metal cleaning and electroplating, other maintenance operations, temporary storage of hazardous waste, fueling operations, and various training operations. The painting of aircraft and components resulted in additional waste generation.

3.1 SITES DESCRIPTION

3.1.1 Site 6A - Fuel Calibration Area

The Fuel Calibration Area is located in the south central portion of the facility. The fuel calibration and related facilities were used in the testing of aircraft fuel and engine systems. Aircraft fuel delivery systems were pressurized with fuel in the calibration area to test for leaks. The testing may have resulted in frequent, small fuel spills to the area's pavement (Navy 1986).

The Fuel Calibration Area consists of a new and old fuel calibration pad, as well as surrounding impacted areas. The old fuel calibration pad was located in what is now an open grass-covered field. The new fuel calibration pad is located to the north and east of the old fuel calibration pad on concrete apron. The concrete apron between the two fuel calibration pads was also used for the same activity. A shed, piping, and fuel filtering devices were still located in the 1980s (USGS 1967; Navy 1986). The equipment has since been removed.

The open field, approximately 10 acres in area, is located immediately south of the old and new calibration pads and is included as part of Site 6A. The old fuel calibration pad was located at the northwestern corner of the field, in an area now partially covered by a wastewater treatment facility. No physical evidence exits of the former calibration area. An area east of the wastewater treatment plant and south of the fuel pad is the former site of a leach field (USGS, 1967; Navy, 1986).

The Fuel Calibration Area is sloped very gently to the south and east. Drainage swales are located parallel to the southern and eastern edges of the pad. The two swales meet east of the south corner of the pad, and enter a southward trending buried culvert. The culvert outfalls to another drainage ditch approximately 625 feet south of the pad. The ditch continues to a shallow pond located approximately 1,500 south-southwest of the pad (USGS 1967). Aircraft hangers and painting shops are located east of the pad. Several small drainage collection ponds are located to the north, east, and south of the Fuel Calibration Area, all within 1,500 feet (USGS, 1967; Navy, 1986).

Three ancillary structures to the Fuel Calibration Area are located to the southeast. These include the covered engine runup area, the hush house, and the Engine Test House (Site 10 B). An excavated area, several acres in size, is located east of the engine runup area blast fence.

3.1.2 Southern Area

The Southern Area is located in the south-central portion of the facility and extends off site to the southeast. The area was investigated because a Suffolk County monitoring well demonstrated the presence of chlorinated VOCs in groundwater downgradient of the facility. There are no known or suspected contaminant sources within this area. However, this area is on the southern boundary of the site and is hydraulically downgradient of the Engine Test House (IR Site 10B), the Fuel Calibration Area (IR Site 6A), and the general industrial complex at the facility. Groundwater flow through this area is to the southeast, with the Peconic River or Flander's Bay being potential discharge points.

The area is mostly wooded, and includes two shallow ponds near the northern edge. The ponds receive runoff through a drainage swale and culvert from the Fuel Calibration Area. From the late 1980's to the early 1990's, groundwater from the Fuel Calibration Area was discharged into this drainage swale and culvert and into the western pond.

3.1.3 Site 7–Fuel Depot Area

Site 7 - Fuel Depot Area is located approximately 3,000 feet north of the South Gate, near the geographic center of the Calverton facility. Site 7 is located at the eastern side of the road leading from the south gate and is approximately 1.3 acres in area, measuring 150 feet in width and 400 feet in length, as shown on Figure 2-1. The principal features of the fuel depot are a large concrete trucking-parking area covering

the southern half of the depot and one underground fuel storage tank area. The former underground storage tank (UST) area is comprised of a 40- by 150-foot area covering the north-central area The former UST area is primarily gravel covered, with scattered concrete pads surrounding fill and vent pipes. A pump house is located at the western edge of the fuel depot, and a maintenance garage was located at the southeastern corner (USGS, 1967; Navy, 1986).

A garage and paved parking area for trucks and equipment formally used by the Northrop Grumman transportation department are located north of Site 7. Areas to the east and south are wooded. A paved roadway leading from the South Gate is adjacent to the depot to the west; a storage building and the fuel system laboratory building are located west of the road (USGS, 1967; Navy, 1986). Site 7 is generally level, with a very slight slope to the east (USGS, 1967).

Site 7 was used for the storage and distribution of fuel products, such as JP-4 and JP-5 jet fuel. Fuels were stored in USTs. Fuels were transferred from the USTs to trucks for use in the flight preparation areas of the facility. Several tanks, ranging in size from 550 to 15,000 gallons, were once used for storage of jet fuel and gasoline. As of April 1998, all petroleum storage tanks have been removed.

3.1.4 Site 9 – Electronic Counter Measures (ECM) Area

The Electronic Counter Measure (ECM) Area is located in the northeast corner of the NWIRP Calverton, (Figure 1-2). This area was constructed in the early 1970's and was recently used for testing and evaluating various electronic counter measures equipment. No manufacturing occurred at this site.

General site features include an old disposal area located approximately 600 feet to the south and two depressions located within a swale located to the southeast (Figure 3-1). It is likely that these depressions used to consist of a natural drainage swale leading to the south. Construction debris and miscellaneous equipment are visible in and around the disposal area and throughout the southeast depression. The former ECM Building (Building 07-39) has been demolished since the initial RFA sampling occurred.

Located to the east of the ECM Area is the property fence line. Beyond the fence line is a sod farm. A portion of the sod farm (nearest the ECM Area) was selected as an experimental program for growing sod using municipal solid waste compost to amend the natural soils and provide nutrients.

4.0 SCOPE OF WORK

The following is a list of activities that are covered in this HASP to be conducted under CTO 0189 and CTO 0270. Note that not all tasks will be conducted at each site.

- Mobilization/demobilization
- Soil boring activities (using hollow stem auger or Direct Push Technology [DPT] techniques, hand augering)
- Monitoring well and piezometer installation, purging, and development
- Multi-media sampling, including surface and subsurface soil, sediment, groundwater and investigative-derived waste (IDW) sampling
- Decontamination of sampling and heavy equipment
- Surveying
- IDW management

The following table summarizes these tasks for each site to be investigated:

	Soil Borings	Monitoring Well Installation	River Gauge Installation	Multi-Media Sampling	Piezometer Installation
Site 6A	X	X		X	
Southern Area	X	X	X	X	X
Site 7	X	X		X	
Site 9	X	X		X	
Other	X	X		X	
Farm House	X	X		X	

For more detailed description of the associated tasks, refer to the Work Plan (WP) and/or Sampling and Analysis Plan (SAP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The PM or a designated representative will submit all requested modifications to this document to the HSM.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of the site-specific HASP which identifies the tasks that are to be performed as part of the scope of work. This table will be modified and incorporated into this document as new or additional tasks are performed at the site. The anticipated hazards, recommended control measures, air-monitoring recommendations, required Personal Protective Equipment (PPE), and decontamination measures for each site task are discussed in detail. This table and the associated control measures shall be changed, if the scope of work, contaminants of concern, or other conditions change.

Through using the table, site personnel can determine which hazards are associated with each task and at each site, and what associated control measures are necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which PPE and decontamination procedures to use based on proper air monitoring techniques and site-specific conditions.

As discussed earlier, the Health and Safety Guidance Manual supports this table and HASP. The manual is designed to further explain supporting programs and elements for other site-specific aspects as required by regulatory requirements. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of TtNUS' SOPs are also provided in this Guidance Manual.

Safe Work Permits issued for all Exclusion Zone activities (See Section 9.4 and Attachment IV) will use elements defined in Table 5-1 as the primary reference. The FOL or the SSO completing the Safe Work Permit will add additional site-specific information. In situations where the Safe Work Permit is more conservative than the direction provided in Table 5-1, the Safe Work Permit will be followed. As the project develops and more information is gained, the SSO will modify the Safe Work Permits to reflect this information.

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TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES–
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring Type/Action Levels	Personal Protective Equipment *Italicize text represents optional equipment to be worn when conditions dictate.*	Decontamination Procedures
Mobilization/ Demobilization	***Chemical hazards:*** 1) Exposure to potential site contaminants is not anticipated during this activity However, chemicals brought on site in support of field activities are to be identified, logged, accompanied by an appropriate MSDS, properly stored, and evaluated for purposes of hazard communication Refer to Section 6.0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities. ***Physical hazards:*** Potential physical hazards associated with this task may include: 2) Lifting (muscle strains and pulls) 3) Pinches and compressions 4) Slip, trips, and falls 5) Vehicular and foot traffic ***Natural Hazards:*** 6) Noise 7) Insect/animal bites and stings	***Chemical hazards:*** 1) To eliminate potential chemical hazards associated with this task ensure the following: - A chemical inventory list is generated for all chemicals brought on site (Complete Section 5.0 of the Health and Safety Guidance Manual) - Material Safety Data Sheets must be available for all chemicals brought on site (Complete Section 5.0 of the Health and Safety Guidance Manual). - Materials are stored in accordance with recommended practices and according to compatibility (See MSDS for storage and compatibility recommendations). ***Physical hazards:*** 2) Use machinery or multiple personnel for heavy lifts. - Use proper lifting techniques. 3) Keep any machine guarding in place. Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points. 4) Preview and prepare work locations where unstable/uneven terrain exists. Barricade all excavations and embankments deeper than 2 feet. 5) Identify all access/egress routes and locations to within established areas of operation. - All equipment capable of self-propelled movement will be equipped with movement alarms as applicable. - Traffic regulations for the facility are to be followed as posted. ***Natural Hazards:*** 6) Hearing protection will be worn in high noise areas. As a general rule of thumb, if you need to raise your voice to be heard while engaged in conversation with someone who is within 2 feet of your position, you may be exposed to excessive noise levels and should use hearing protection. 7) Use insect repellents and/or Tyvek coveralls to minimize contact. See Section 6.3.1 and Attachment II of this HASP for protection against mosquito and tick hazards.	Not required during mobilization/demobilization.	Mobilization/demobilization activities is intended to initiate and proceed in Level D protection: Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants; or coveralls) - Safety shoes or boots with steel toe - Safety glasses - *Hardhat (when overhead hazards exists, or identified as an operation requirement)* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario..* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	As potential site contaminants are not anticipated as part of this task, personal decontamination is not required. All equipment arriving/leaving the site will be inspected prior to permitting this equipment to enter or exit the site. The SSO will inspect the equipment and give the clearance to allow the equipment to pass. Failure to pass inspection will prohibit entering or exiting the site as applicable. All equipment that fails the inspection will have to be decontaminated again to a level acceptable to the SSO prior to passage on or off site. All equipment permitted to pass on/off site will be documented using an Equipment Inspection Checklist. This form may be found in Attachment III of this HASP.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment *Italicize text represents optional equipment to be worn when conditions dictate.*	Decontamination Procedures
Geographical surveying activities	***Chemical hazards:*** **Exposure to potential site contaminants during surveying activities is unlikely given the nature of surveying work and the limited contact with potentially contaminated media (soils, sediments, surface water, etc.). To further reduce the potential for exposure, site personnel performing surveying activities will minimize contact with potentially contaminated media and will avoid areas where chemical hazards may exist.** Refer to Section 6.0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities. ***Physical hazards:*** 1) Slip, trips, and falls ***Natural hazards:*** 2) Insect/animal bites and stings, poisonous plants 3) Inclement weather	1) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation and establish temporary means for traversing hazardous terrain (e g. rope ladders) ***Natural hazards:*** 2) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents Avoid contact with poisonous vegetation Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to your skin. Wear light-colored clothing so that ticks and other biting insects can be easily visible and be removed. Also see Section 6.3.1 and Attachment II of this HASP for protection against mosquito and tick hazards. 3) All operations will be temporarily suspended during electrical storms or other inclement weather.	No air monitoring is needed given that volatile contaminants are not likely to be present during surveying activities. The potential for exposure to site contaminants during this activity is considered minimal. Minimize the generation of airborne dusts since many site contaminants are in the form of a particulate or may be bound to particulates.	Surveying activities shall be performed in Level D protection Level D Protection consists of the following: - Standard field dress including sleeved shirt and long pants - Steel-toe work boots or shoes - *Safety glasses, hard hats (if working near machinery)* - *Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks.* - *Leather/cotton Work gloves may be worn if desired.* - *Snake chaps for heavily wooded areas where encounters are likely.* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	Personnel Decontamination - A structured decontamination is not required, as the likelihood of encountering contaminated media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be used to stop the transfer of these insects into vehicles, homes, and offices.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK
PAGE 3 OF 5

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment *Italicize text represents optional equipment to be worn as conditions dictate.*	Decontamination Procedures
Multi-media sampling including soils (surface and subsurface), sediments, groundwater; and Investigative Derived Waste (IDW) Management.	***Chemical hazards:*** 1) Potential site contaminants include VOCs including gasoline and JP-4 SVOCs, including diesel fuel, and general PAHs. Refer to Section 6.0 for a list of potential and representative site contaminants See individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities. 2) Transfer of contaminants into clean areas or onto persons ***Physical hazards:*** 3) Lifting (muscle strains and pulls) 4) Pinches and compressions 5) Slip, trips, and falls ***Natural hazards:*** 6) Insect/animal bites and stings 7) Inclement weather	***Chemical hazards:*** 1) Use real-time monitoring instrumentation, action levels, and identified PPE to identify, quantify, and control exposures to potentially contaminated media (e.g., air, water, soils). 2) Restrict the cross-use of equipment and supplies between sampling locations without first going through a suitable decontamination ***Physical hazards:*** 3) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 4) Keep any machine guarding in place. Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points. - A remote sampling device must be used to sample drill cuttings near rotating tools. The equipment operator shall shutdown machinery if the sampler is near moving machinery parts. 5) Preview work locations for unstable/uneven terrain. ***Natural hazards:*** 6) Avoid insect nesting areas. Report potential hazards to the SSO If necessary use insect repellents and/or Tyvek coveralls to minimize contact. See Section 6 3.1 and Attachment II of this HASP for protection against mosquito and tick hazards. 7) All operations will be temporarily suspended during electrical storms.	**Elevated airborne concentrations that present exposure hazards are not anticipated during these operations given the limited disruption and intrusive nature of subsurface boring sampling.** Direct reading instruments such as a Photoionization Detector (PID) with an 8.97 eV source (or higher) or Flame Ionization Detector (FID) will be used as a general screening instrument to detect VOCs and to evaluate airborne concentrations of potential site contaminants: Source areas (sample locations, borings, etc) will be monitored using a PID or FID at regular intervals to be determined by the SSO Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions: Monitor the breathing zone of at-risk and downwind employees Any sustained reading (greater than 1 minute in duration) greater than 50 ppm above background in worker breathing zones requires site activities to be suspended and site personnel to report to an unaffected area. Work may only resume if airborne readings in worker breathing zones return to less than 50 ppm. If elevated readings in worker breathing zones persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection.	All sampling activities are anticipated to proceed in a modified Level D protection as specified below: Level D - (Minimum Requirements) For sampling activities: - Standard field attire (Sleeved shirt; long pants) - Safety shoes or boots (Steel toe) - Safety glasses - Nitrile gloves (Clean pair for each sample location), layered if necessary - *Hard-hat (when overhead hazards exists, or identified as an operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	Decontaminate sample containers in accordance with the Field Sampling Plan. **Personnel decontamination:** - Equipment drop-off - Wash and rinse reusable outer protective garments - Remove and dispose of disposable PPE - Wash hands and face, leave contamination reduction zone. **Equipment decontamination:** See Task - Decontamination of Sampling and Heavy Equipment

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Level	Personal Protective Equipment *Italicize text represents optional equipment to be worn as conditions dictate.*	Decontamination Procedures
Soil Borings Soil boring activities will be performed using hollow stem auger, direct push technology (DPT), techniques or hand auguring. This task includes monitoring well, piezometer, and river guage installation.	***Chemical hazards:*** 1) Potential site contaminants include VOCs including gasoline and JP-4. SVOCs, including diesel fuel, and general PAHs. Refer to Section 6.0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities. 2) Transfer of contamination into clean areas or onto clean persons. ***Physical hazards:*** 3) Rotating machinery (entanglement) 4) Noise 5) Energized systems 6) Slips, trips, and falls 7) Pinch/compression ***Natural hazards:*** 8) Insect/animal bites and stings 9) Inclement weather 10) Water hazards	***Chemical hazards:*** 1) Use real-time monitoring instrumentation, action levels, identified PPE, and work practices to control exposures to potentially contaminated media (air, water, soils, etc). 2) Decontaminate all equipment and supplies between borings and prior to leaving the site. ***Physical hazards:*** 3) All equipment to be used will be - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926 600.601.602), and manufacturer's design. All inspections will be documented using the Equipment Inspection Checklist found in Attachment III of this HASP. - Operated and supported by knowledgeable operators, and ground crew. - Used within safe work zones, with routes of approach clearly demarcated. All personnel not directly supporting this operation will remain at least 25 feet from the point of operation. This will be the area identified as the exclusion zone. In addition to equipment considerations, the following safe operating procedures will be incorporated: - Hydraulic masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities - Hand signals will be established prior to the commencement of the operation. - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (e g., flight connectors). - Work areas will be kept clear of clutter. - Secure all loose articles to avoid possible entanglement during coring activities. - All self-propelled equipment shall be equipped with movement warning systems. - All personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then periodically) to ensure its operational status. - Areas will be inspected prior to the movement of the drill rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - The drill rig and support vehicles will be moved no closer than 3 feet to unsupported side-walls of excavations and embankments. 4) Hearing protection will be used during all drill rig intrusive activities. 5) All utility clearances shall be obtained prior to any subsurface investigation. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked Follow the guidelines established in Attachment V (Utility Locating and Excavation Clearance SOP) The FOL will obtain written permit clearance prior to all subsurface investigations. 6) Preview and prepare work locations where unstable/uneven terrain exists. 7) Keep machine guards in place. Avoid moving parts. Secure long clothing, hair, or jewelry that could be entangled. ***Natural hazards:*** 8) This activity may take place in remote locations where natural hazards are a concern To control this hazard. - Preview all work areas to remove or barricade physical hazards or potential nesting areas. - Avoid insect nesting areas. Clear sufficient area around the drill rig to permit unimpeded work Report potential hazards to the SSO. If necessary use insect repellents and/or Tyvek coveralls to minimize contact See Section 6.3.1 and Attachment II of this HASP for protection against mosquito and tick hazards. 9) All operations will be temporarily suspended during electrical storms. 10) While working over or near water, personnel shall wear (at a minimum) U S Coast Guard-approved personal flotation devices. As necessary, lifelines, safety harnesses, and other personal safety devices shall be used when working within 4 ft of the waters edge.	**Elevated airborne concentrations that present exposure hazards are not anticipated during these operations given the limited disruption and intrusive nature of subsurface boring sampling.** Direct reading instrument such as a Photoionization Detector (PID) with an 8 97 eV source (or higher) or Flame Ionization Detector (FID) will be used as a general screening instrument to detect volatile organic compounds and to evaluate airborne concentrations of potential site contaminants: Source areas (sample locations, borings, etc.) will be monitored using a PID or FID at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions: Monitor the breathing zone of at-risk and downwind employees. Any sustained reading (greater than 1 minute in duration) greater than 50 ppm above background in worker breathing zones requires site activities to be suspended and site personnel to report to an unaffected area. Work may only resume if airborne readings in worker breathing zone return to background levels. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. Where the utility clearance cannot be determined, subsurface activities shall proceed with extreme caution using hand digging to at least below the frost-line depth (no less than 4 ft. BGS). Also, a magnetometer must be used for periodic down-hole surveys every 2 feet to a depth of at least 10 feet.	All surface and subsurface boring operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection - Standard field dress (long pants, sleeved shirts) - Steel-toe safety shoes or boots(except for magnetometer use) These following items will be incorporated during Subsurface boring operations: - Nitrile gloves - Hard-hat, safety glasses, and earplugs or muffs. *- Tyvek coveralls will be worn if there is a possibility of soiling work attire.* *- PVC or PE coated Tyvek will be incorporated if there is a potential for saturation of work attire.* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** - Will consist of a soap/water wash and rinse for outer protective equipment (e.g boots, gloves, PVC splash suits, etc.). This function will take place at an area adjacent to the drilling operations bordering the support zone. This decontamination procedure for Level D protection will consist of - Equipment drop - Remove and dispose of any disposable PPE (Tyvek coveralls, outer gloves, etc.) - Soap/water wash and rinse of reusable PPE items (e.g., splash suit, boots). - Wash hands and face; leave contamination reduction zone **Equipment Decontamination** - See Page 5-5 of this table. All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible for evaluating equipment arriving on site and prior to leaving the site. No equipment will be authorized access or exit without this inspection and authorization. See Attachment III - Equipment Inspection Checklist.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
NAVAL WEAPONS INDUSTRIAL RESERVE CALVERTON, NEW YORK

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment *Italicized text represent optional equipment to be worn as conditions dictate*	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment	***Chemical Hazards*** 1) Potential site contaminants include VOCs including gasoline and JP-4. SVOCs, including diesel fuel, and general PAHs. Refer to Section 6 0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment IV for specific contaminants of concern associated with particular sites and site activities. 2) Decontamination fluids - Liquinox (detergent), acetone or isopropanol *Physical Hazards* 3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Vehicular and foot traffic 7) Slips, trips, and falls *Natural Hazards* 8) Inclement weather 9) Insect bites	1) and 2) Use protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination fluids used onsite. These must be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication section of the Health and Safety Guidance Manual (Section 5). ***Physical hazards:*** 3) Use multiple persons where necessary for lifting and handling sampling equipment for decontamination purposes. 4) Wear hearing protection when operating pressure washer 5) Use eye and face protective equipment when operating pressure washer All other personnel must be restricted from the area 6) Traffic and equipment considerations are to include the following: - Establish safe zones of approach. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the facility requirements. 7) Preview work locations for unstable/uneven terrain. ***Natural hazards:*** 8) Suspend or terminate operations until directed otherwise by SSO. 9) Use insect repellents and/or Tyvek coveralls to minimize contact See Section 6.3.1 and Attachment II of this HASP for protection against mosquito and tick hazards.	Use visual observation, and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried. After decon is completed, screen equipment with a PID/FID If any elevated readings (i.e., greater than 50 ppm above background) are observed, perform decon again and re-screen. Repeat until no elevated PID/FID readings are noted.	For Heavy Equipment This applies to high-pressure soap/water, steam cleaning wash and rinse procedures. Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves - Safety glasses underneath a splash shield - *Hearing protection (plugs or muffs)when operating pressure washer.* - *PVC Rainsuits or PE or PVC coated Tyvek* - *Chemical resistant boot covers* For sampling equipment the following PPE is required Note: Consult MSDS for PPE guidance. Otherwise, observe the following. Level D Minimum requirements - - Standard field attire (Long sleeve shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves - Safety glasses In the event of overspray of chemical decontamination fluid use PVC Rainsuits or PE or PVC coated Tyvek as necessary. **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decontamination function will take place at an area adjacent to the site activities. This procedure will consist of: - Equipment drop - Soap/water wash and rinse of outer boots and gloves, as applicable - Soap/water wash and rinse of the outer splash suit, as applicable - Disposable PPE will be removed and bagged. **Equipment Decontamination** - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity. **Sampling Equipment Decontamination** Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan. MSDS for any decon solutions (Alconox, isopropanol, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.). All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible to evaluate equipment as it arrives and leaves the site. No equipment will be authorized access or exit without this evaluation See Attachment III Equipment Inspection Checklist.

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards anticipated to be present during the activities to be conducted. Table 6-1 provides information related to chemical constituents that have been identified by analysis or are suspected to be present at the site based on historical data. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data is discussed in the table.

6.1 CHEMICAL HAZARDS

The potential health hazards associated with the tasks to be conducted at NWIRP Calverton include inhalation, ingestion, and dermal contact of various contaminants that may be present in shallow and deep soils, sediment, and groundwater. Based on prior sampling activities at the site and site history, the types of contaminants anticipated include petroleum-based liquids (fuels). As discussed in Section 3, various classes of contaminants were detected at the sites to be investigated during this project. Many of the contaminants were detected, however, in concentrations too low to represent a significant health hazard. Therefore, the following have been identified as the primary potential contaminants from a health and safety perspective:

- Volatile Organic Compounds (VOCs) including gasoline and JP-4.
- Semi-Volatile Organic Compounds (SVOCs), including diesel fuel, and general Polynuclear Aromatic Hydrocarbons (PAHs)

Depending on the location where work is being conducted, the applicable contaminants may vary.

Table 6-1 provides information on the individual substances likely to be present at the sites of concern. Included is information on the toxicological, chemical, and physical properties of these substances. It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (drilling, soil sampling, etc.). Exposure to these compounds is most likely to occur through ingestion and inhalation of contaminated soil or water, or hand-to-mouth contact during soil disturbance activities. For this reason, PPE and basic hygiene practices (washing face and hands before leaving site) will be extremely important. Inhalation exposure will be avoided by using appropriate PPE and engineering controls where necessary.

6.2 PHYSICAL HAZARDS

The physical hazards that may be present during the performance of site activities are summarized below:

- Heavy equipment hazards (moving components, rotating equipment, etc.).
- Slips, trips, and falls
- Energized systems (contact with underground or overhead utilities)
- Lifting (strain/muscle pulls)
- Noise in excess of 85 decibels (dBA)
- Flying projectiles
- Pinches and compressions
- Vehicular and foot traffic

These physical hazards are discussed in Table 5-1 as applicable to each site task. Further, many of these hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual. Specific discussions on some of these hazards are presented below.

6.2.1 Heavy Equipment Hazards (Moving components, rotating equipment, etc.)

Often the hazards associated with drilling operations are the most dangerous to be encountered during site activities. The SSO will thoroughly discuss safe drilling procedures during the pre-activities training session. All site personnel will sign the form in Figure 8-2 documenting that they received the training and understand the procedures. The following rules will apply to all drilling operations:

- Each rig must be equipped with emergency stop devices which will be tested daily to ensure that they are operational.

- Long handled shovels or equivalent shall be used to clear cuttings from the borehole and rotating equipment.

- The driller may not leave the controls when the augers are rotating.

6.2.2 Energized Systems (Contact with Underground or Overhead Utilities)

Underground utilities such as pressurized lines, water lines, telephone lines, buried utility lines, and high voltage power lines may be present throughout the facility. **Therefore, all subsurface activities must be conducted following the requirements of the TtNUS SOP for "Utility Locating and Excavation**

Clearance (HS-1.0)". A copy of this SOP is provided as Attachment V. Clearance of underground and overhead utilities for each sample location will be coordinated with NWIRP Calverton personnel. Additionally, drilling operations will be conducted at a safe distance (>20 feet) from overhead power lines. Whenever underground utilities are suspected to be close to subsurface sampling locations, the borehole will be advanced to a minimum of four (4) feet BGS (see page 4-5 of Table 5-1) with a hand auger prior to drilling. As built drawings may also be utilized for additional clarification.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. In general, avoidance of areas of known infestation or growth will be the preferred exposure control for insects/animals and poisonous plants. Specific discussion on principle hazards of concern follows:

6.3.1 Insect/Animal Bites and Stings, Poisonous Plants, etc.

During warm months (spring through early fall), tick-borne Lyme Disease may pose a potential health hazard. The longer a disease carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots). As well as performing frequent body checks will prevent long term attachment. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures, and symptoms of exposure, consult Section 4.0 of the Health and Safety Guidance Manual.

Contact with poisonous plants and bites or stings from poisonous insects are other biological hazards that must be considered. Long pants (tucked into boots), and avoiding potential nesting areas will minimize the hazards of exposure. All site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SSO notified.

6.3.1.1 West Nile Virus

In the Fall of 1999 Federal health officials confirmed the presence of the West Nile Virus in horses from eastern Suffolk County. However, there were no reported cases of the West Nile encephalitis in humans. Spraying activities were started but suspended when the weather turned cold and mosquito activity greatly diminished. At the time even though the mosquito population was at a minimum, residents were still urged to take personal precautions. It is unknown at this time if it is expected to resume this Spring.

Encephalitis is an inflammation of the brain and can be caused by bacteria and viruses. West Nile encephalitis is caused by a virus transmitted to humans by mosquitoes. West Nile virus is commonly found in Africa, West Asia, and the Middle East. It is closely related to St. Louis encephalitis virus found in the United States. The West Nile-like virus that has been found in New York is genetically related to West Nile virus, but because of genetic differences it may be a new subtype of West Nile virus.

The mosquito becomes infected by feeding on birds infected with the West Nile virus. Infected mosquitoes then transmit the West Nile virus to humans and animals when biting (or taking a blood-meal). West Nile encephalitis is NOT transmitted from person-to-person. There is no evidence that a person can get the virus from handling live or dead infected birds. However, avoid bare-handed contact when handling any dead animals, including dead birds. Ticks have not been implicated as vectors of West Nile-like virus.

Mild infections are common and include fever, headache, and body aches, often with skin rash and swollen lymph glands. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions, paralysis and, rarely death (especially in the elderly and very young). The incubation period of West Nile encephalitis is usually 3 to 12 days. There is no specific therapy or vaccine against West Nile encephalitis. No cases have previously been reported in the U.S. prior to September 1999 (in New York). It is not known how long it has been in the U.S., but scientists believe the virus has probably been in the eastern U.S. for several months, possibly longer.

Precautions from the Suffolk County Department of Health include:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.
- Avoid standing water
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Apply insect repellent to exposed skin following manufactures instructions. An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide). Avoid products containing more than 30% DEET.
- Spray clothing with repellents containing permethrin or DEET, mosquitoes may bite through thin clothing.

For further information contact:
Suffolk County Department of Health Services
225 Rabro Drive
Hauppauge, NY 11788
(631) 853-3002.

6.3.2 Inclement Weather

Many of the project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather (electrical storms, hurricanes, etc) conditions arise, the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK
PAGE 1 OF 2

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Diesel Fuel No 2-D	Mixture	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID	Air sampling use charcoal tube as a collection media, carbon disulfide desorption, GC/FID detection Sampling and analytical protocol in accordance with NIOSH Method #1550	OSHA/NIOSH/ACGIH 5 mg/m³ as mineral oil mist In addition NIOSH and ACGIH establish 10 mg/m³ as a STEL	Kerosene odor **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** Nitrile	**Boiling Pt:** <170-400°F, 77-204°C **Melting Pt.** Not available **Solubility:** Negligible **Flash Pt:** 125°F, 52°C **LEL/LFL:** 0 6% **UEL/UFL.** 7 5% **Vapor Density:** >5 **Vapor Pressure:** <1 mmHg @ 70°F, 21 °C **Specific Gravity** 0 86 **Incompatibilities:** strong oxidizers, halogens, and hypochlorites **Appearance and odor:** Colorless to - amber with a kerosene odor	Prolonged or repeated exposures to this product may cause skin and eye irritation Due to the defatting capabilities this exposure may lead to a dermatitis condition High vapor concentrations are irritating to the eyes and respiratory tract Exposure to high airborne concentrations may result in narcotic effects including dizziness, headaches, and anesthetic to unconsciousness High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation
JP-4	N/A	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either the PID or FID	Air sample using charcoal tube and carbon disulfide desorption, Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501	USAF 8 hr - 200 ppm	Kerosene odor threshold ~ 800 ppm Rating - Poor to Adequate **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** Nitrile	**Boiling Pt:** <290-470°F, 143-243°C **Melting Pt:** Not available **Solubility:** Negligible **Flash Pt:**-10 to -50°F, -23 to -45°C **LEL/LFL:** <1% **UEL/UFL:** 8% **Vapor Density:** >1 **Vapor Pressure:** 75 mmHg, 70°F, 21°C **Specific Gravity:** 0 78 **Incompatibilities:** strong oxidizers **Appearance and odor:** Colorless to amber with a kerosene odor	Based on the constituents of jet fuels, it can be surmised that JP-4 is irritating to the eyes, skin, and respiratory tract **Direct contact** may result in mild irritation with a possible drying and defatting of the skin **Ingestion** may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal **Inhalation** of vapors or mists of JP-4 may result in headache, nausea, confusion,narcotic effect, and drowsiness Chronic inhalation of jet fuel vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, CALVERTON, NEW YORK
PAGE 2 OF 2

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
General PAHs / Coal Tar Pitch Volatiles / Creosote / cresol (Fluoranthene, pyrene, benzo(a) anthracene, benzo(a) pyrene, benzo(f)fluoranthene, benzo(k)fluoranthene), etc)	(CAS Numbers vary depending on specific compound)	PID I P of 8 97 eV, relative response ratio unknown FID Response factor unknown but given the substances flammability, detection by FID can be anticipated	Refer to NIOSH methods for each specific compound for appropriate air sampling protocols Many PAHs can be sampled using NIOSH Method 5506 or 5515 - Teflon filter with support ring - High pressure liquid chromatography with UV detector For cresol (a major constituent of creosote) by silica gel or xad-7 sorbent tube, Acetone desorption and analysis by gas chromatography - flame ionization detector or high-pressure liquid chromatography (NIOSH Method #2001, or OSHA Method #32)	**General PAHs** Most PAHs have no established exposure limits Other Coal Tar Pitch Volatiles / PAHs such as chrysene and benzo(a)pyrene have an exposure limit of 0 2 mg/m³ (OSHA and ACGIH) 0 1 mg/m³ - (NIOSH) **Creosote / Cresol:** OSHA, ACGIH 5 ppm NIOSH 2 3 ppm IDLH 80 mg/m³	Adequate - use a full-face air-purifying respirator with organic vapor / dust/mist cartridge up to 250 ppm Cresol has an Odor Threshold of 0 00005-0 0079 ppm **Recommended gloves:** Viton >96 00 hrs, butyl rubber >90 00 hrs, neoprene >4 50 hrs	Properties of various PAHs/Coal Tar Pitch Volatiles vary depending upon the specific compound. *For Creosote/Cresol* **Boiling Pt:** 376-397°F, 191-203°C **Melting Pt:** 52-96°F, 10 9-35 5°C **Solubility:** Insoluble **Flash Pt:** 178°F, 81°C **LEL/LFL:** Not available **UEL/UFL:** Not available **Vapor Density** 3 72 **Vapor Pressure** 1 mmHg @ 100-127°F, 38-53°C **Specific Gravity:** 1 030-1 038 **Incompatibilities:** Nitric acid, oleum, chlorosulfonic acid, oxidizers **Appearance and Odor:** Yellowish or colorless, flammable, oily liquid (often brownish because of impurities or oxidation)	Regulated based on effects on respiratory tract and skin irritation Other effects may include eye irritation and central nervous system, distrubances Acute exposures may result in difficulty breathing, respiratory failure and skin and eye irritation and burns Chronic exposure may damage the liver, kidneys, lungs and skin and cause photosensitivity IARC, NTP, NIOSH, ACGIH, and the EPA list some PAHs such as benzo(a)pyrene as a potential carcinogen (ARC 2A, NTP-2, ACGIH TLV-A2, NIOSH-X, EPA-B2)
Gasoline	8006-61-9	Relative response ratios for the components of gasoline range from 100 - 200% for PID and FID detection	See components for measurement considerations	ACGIH & OSHA 300 ppm 500 ppm STEL NIOSH Reduce to lowest feasible concentration	**Respiratory Protection** Odor threshold 0 7 ppm, adequate air purifying respirator with organic vapor cartridges up to 100 ppm **Recommended Gloves:** Nitrile >6 00 hrs, PV alcohol >6 00 hrs, Viton/neoprene >8 00 hrs	**Boiling Pt:** 102°F, 39°C **Melting Pt:** Not available **Solubility** Negligible **Flash Pt** -50°F, -45°C **LEL/LFL:** 1 4% **UEL/UFL:** 7 6% **Vapor Density:** ~5 **Vapor Pressure:** 38-300 mmHg (varies seasonally) **Specific Gravity:** 0 74 @ 20/20°C **Incompatibilities:** Strong oxidizers, peroxides, strong acids, and perchlorates **Appearance and Odor:** Colorless liquid with gasoline odor	Overexposure to this substance may result in irritation to the eyes, skin, and mucous membranes Systemically, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, possible convulsion, and chemical pneumonia (aspiration) Prolonged or chronic exposures may result in possible liver or kidney damage Components of this substance have been determined to be confirmed human carcinogens

7.0 AIR MONITORING

Most of the anticipated site contaminants are not volatile or are semi-volatile, and are difficult to be detected with the use of direct reading instruments (DRIs). Specifically, the metals, pesticides, and PCBs exhibit poor detection characteristics due to their non-volatile nature and low vapor pressure property. Nonetheless, DRIs will be used to screen source areas (sample locations, wells, etc.) and worker breathing zones for any detectable contaminants. Action levels are listed in Table 5-1 as they may apply to a specific task or location. This approach (coupled with the use of personal protective equipment and the observance of the other control requirements presented in this HASP) will minimize the potential for personnel exposures to hazardous concentrations (known or unknown) of airborne contaminants. Additionally, the Health and Safety Guidance Manual, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector or Flame Ionization Detector

In order to accurately monitor for any substances which may present an exposure potential to site personnel, a Photoionization Detector (PID) using a lamp energy of 8.97 eV or higher will be used. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting some of the organic vapors of concern (NOTE: A Flame Ionization Detector [FID] may be used as an alternative to the PID).

Prior to the commencement of any field activities, the background levels of the site must be determined. Daily background readings will be taken in clean areas away from any potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels which will initiate the use of elevated levels of protection. The SSO may decide to increases these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager. Operational checks and field calibration will be performed on all instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site for reference). All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that all of the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: _____ PROJECT NO.:_____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for both TtNUS and subcontractor personnel participating in site activities.

8.1.1 Requirements for TtNUS Personnel

All TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the NWIRP facility. Additionally, TtNUS personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training in the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120 (e)(4) will be required for site supervisory personnel.

Documentation of TtNUS introductory, supervisory, and refresher training as well as site-specific training will be maintained at the project. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.1.2 Requirements for Subcontractors

All TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120 (e). Additionally, personnel who have had the introductory training more than 12 months ago, are required to have 8 hours of refresher training meeting the requirements of 29 CFR 1910.120 (e)(8) prior to performing field work at the NWIRP facility if required. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided as in Figure 8-1 and by providing copies of certificates for all subcontractor personnel participating in site activities.

FIGURE 8-1
TRAINING LETTER

The following statements must be typed on company letterhead and signed by an officer of the company and accompanied by copies of personnel training certificates:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. David D. Brayack, P.E.
Project Manager
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Training for NWIRP, Calverton, New York

Dear Mr. Brayack:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with all applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 1926.

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires appropriate level of training for certain employees engaged in hazardous waste operations. In this regard, I hereby state that the following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as requested by 29 CFR 1910.120(e) and have had 8 hour of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

Enclosed: Training Certificates

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all TtNUS employees and subcontractor personnel who will perform work on this project. Site-specific training will also be provided to all personnel (U.S. Department of Defense, EPA, etc.) who may enter the site to perform functions that may or may not be directly related to site operations. Site-Specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

Site-specific documentation will be established through the use of Figure 8-2. All site personnel and visitors must sign this document upon receiving site-specific training.

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS Personnel

All TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained in the TtNUS Pittsburgh office and made available, as necessary.

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing remedial investigation activities at NWIRP, Calverton, New York, and that I have received site-specific training which included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits

My signature below indicates that I have been given the opportunity to ask questions and that all of my questions have been answered to my satisfaction, and that the dates of my training and medical surveillance indicated below are accurate.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

8.3.2 Medical Surveillance Requirements for Subcontractors

Subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" provided in Figure 8-3 shall be used to satisfy this requirement, providing it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute "Subcontractor Medical Approval Form" (See Figure 8-3) with a letter, on company letterhead, containing all of the information in the example letter presented in Figure 8-4 of this HASP.

8.3.3 Requirements for All Field Personnel

Each field team member (including subcontractors) and visitors entering the Exclusion Zone(s) shall be required to complete and submit a copy of Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

Subcontractors who will not enter the Exclusion Zone during intrusive operations, and whose activities involve no potential for exposure to site contaminants, will not be required to meet the requirements for training/medical surveillance other than those stated for site-specific training (See Section 8.2).

FIGURE 8-3

SUBCONTRACTOR MEDICAL APPROVAL FORM

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f) and found to be medically -

   ( ) qualified to perform work at the NWIRP Calverton work site
   ( ) not qualified to perform work at the NWIRP Calverton work site

   and,

2. Undergone a physical examination as per OSHA 29 CFR 1910.134(b)(10) and found to be medically -

   ( ) qualified to wear respiratory protection
   ( ) not qualified to wear respiratory protection

My evaluation has been based on the following information, as provided to me by the employer.

( ) A copy of OSHA Standard 29 CFR 1910.120 and appendices.
( ) A description of the employee's duties as they relate to the employee's exposures.
( ) A list of known/suspected contaminants and their concentrations (if known).
( ) A description of any personal protective equipment used or to be used.
( ) Information from previous medical examinations of the employee which is not readily available to the examining physician.

Part B

I, _____, have examined _____
Physician's Name (print) Participant's Name (print)
and have determined the following information:

FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

   _____
   _____
   _____

2. Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health:

   _____
   _____
   _____

3. Recommended limitations upon the employee's assigned work:

   _____
   _____
   _____

I have informed this participant of the results of this medical examination and any medical conditions which require further examination of treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NWIRP Calverton work site, this participant

( ) may
( ) may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

NOTE: Copies of test results are maintained and available at:

_____
Address

FIGURE 8-4

MEDICAL SURVEILLANCE LETTER

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. David D. Brayack, P.E.
Project Manager
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

Subject: HAZWOPER Medical Surveillance for NWIRP, Calverton, New York

Dear Mr. Brayack:

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR) Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response. I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a license physician, to perform hazardous waste site work and to wear positive- and negative-pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working at the NWIRP Calverton facility.

LIST OF FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

9.0 SITE CONTROL

This section outlines the means by which TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site: Exclusion Zone, Contamination Reduction Zone, and Support Zone. It is also anticipated that this control measure will be used to control access to site work areas. Use of such controls will restrict the general public, minimize potentials for the spread of contaminants and to protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The Exclusion Zone will be considered those areas of the site of known or suspected contamination. It is not anticipated that significant amounts of surface contamination are in the proposed work areas of this site. It is anticipated that this will remain so until/unless contaminants are brought to the surface by intrusive activities such as drilling. Furthermore, once such activities have been completed and surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the Contamination Reduction Zone. Therefore, the Exclusion Zones for this project will be limited to those areas if the site where active work is being performed plus so many feet surrounding the point of operation (See Table 5-1 for specific operation). The Exclusion Zone for this activity will represent the areas where the soils are disturbed through soil borings, well installations, and sampling activities. All Exclusion Zones will be delineated (e.g., barrier tape, cones and/or postings) to inform and direct facility personnel.

9.1.1 Exclusion Zone Clearance

A pre-startup site visit will be conducted by members of the field team in an effort to identify proposed subsurface investigation locations, conduct utility clearances, and provide up-front notices concerning scheduled activities within the facility. In all cases, no subsurface activities will proceed without utility clearance and all activities must follow the TtNUS SOP for Utility Locating and Excavation Clearance. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Table 2-1 will be notified.

If any other personnel are working within the proximity of this investigation, they will be moved or their operation temporarily discontinued to remove them from potential hazards associated with this operation.

The exclusion zone will be considered those areas of active operations plus an established safety zone depending on the task. The following represent the exclusion zone boundaries for the following identified tasks:

- Monitoring Well Installation – The boundary perimeter will be established by determining the height of the mast, plus five feet. Therefore, if it is a 35-foot mast plus 5 feet equals a 40-foot boundary surrounding the point of operation.

- Well Development – 10 feet surrounding the well head and discharge point.

- Groundwater sampling – 10 feet surrounding the well head.

- Surface/subsurface soils, surface water, sediments – 5 feet surrounding the sample collection point.

- Decontamination (heavy equipment – steam/pressure washers) – 35 feet surrounding the point of operation. This will take place at a centralized location.

Exclusion zones will be delineated using barrier tape, cones and/or drive poles, and postings to inform and direct facility site personnel and visitors, as necessary.

9.2 CONTAMINATION REDUCTION ZONE

The Contamination Reduction Zone (CRZ) will be a buffer area between the Exclusion Zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting Exclusion Zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. All equipment potentially contaminated will be bagged and taken to that location for decontamination.

9.3 SUPPORT ZONE

The Support Zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. In all cases, the Support Zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

All Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. Partially completed Permits for the work to be performed are included in Attachment IV. The daily meetings conducted at the site will further support these work permits. This effort will ensure all site-specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signature of the FOL and SSO.

Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

FIGURE 9-1
SAFE WORK PERMIT

Permit No _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope (To be filled in by person performing work)

I. Work limited to the following (description, area, equipment used): _____

_____

_____

II. Names: _____

_____

III. Onsite Inspection conducted Yes No Initials of Inspector _____ _____
TtNUS NWIRP

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required

Level D Level B
Level C Level A
Detailed on Reverse

Respiratory equipment required

Full face APR Escape Pack
Half face APR SCBA
SKA-PAC SAR Bottle Trailer
Skid Rig None

Modifications/Exceptions: _____

_____

V.

Chemicals of Concern	Action Level(s)	Response Measures
_____	_____	_____
_____	_____	_____

VI. Additional Safety Equipment/Procedures

Hardhat	Yes	No	Hearing Protection (Plugs/Muffs)	Yes	No
Safety Glasses	Yes	No	Safety belt/harness	Yes	No
Chemical/splash goggles	Yes	No	Radio	Yes	No
Splash Shield	Yes	No	Barricades	Yes	No
Splash suits/coveralls	Yes	No	Gloves (Type)	Yes	No
Steel toe/shank Workboots	Yes	No	Work/rest regimen	Yes	No

Modifications/Exceptions: _____

VII.

Procedure review with permit acceptors	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)			Emergency alarms		
Procedure for safe job completion			Evacuation routes		
Contractor tools/equipment inspected			Assembly points		

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressured		
Equipment purged/cleaned		
Isolation checklist completed		
Electrical lockout required/field switch tested		
Blinds/misalignments/blocks & bleeds in place		
Hazardous materials on walls/behind liners considered		

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) Yes No
If yes, fill out appropriate section(s) on safety work permit addendum

X. Special instructions, precautions: _____

_____

Permit Issued by: _____ Permit Accepted by: _____
Job Completed by: _____ Date: _____

9.5 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (DOD, OSHA, etc.)
- Northern Division Navy Personnel
- Other authorized visitors

It is not anticipated that this operation will result in a large number of site visitors. However, as some visitors can reasonably be expected, the following requirements will be enforced:

- All site visitors will be routed to the FOL, who will sign them in to the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), who they represent, and purpose for the visit.

- All site visitors will be required to produce the necessary information supporting clearance onto the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for all Northern Division Navy personnel) and medical surveillance, as stipulated in Section 8 of this document. In addition, to enter the site's operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this document.

NOTE: All site visitors will be escorted at all times while at the site.

Following this, the site visitor will be permitted to enter the site and applicable operational areas. All visitors are required to observe the protective equipment and site restrictions in effect at the area of their visit. Any and all visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause all onsite activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the NWIRP Calverton Contact and, if necessary, the Riverhead Police Department.

9.6 SITE SECURITY

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As this activity takes place at a closed Navy facility it is possible to encounter

unexpected individuals due to the relaxed security. Therefore, the first line of security will take place using Exclusion Zone barriers, and any existing barriers at the sites to restrict unauthorized access.. The second line of security will take place at the work site referring interested parties to the FOL or designee. The FOL will serve as a focal point for all non-project interested parties, and serve as the final line of security and the primary enforcement contact will be the Riverhead Police Department.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. When possible, these maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on site activities will practice the "buddy system" to ensure the safety of all personnel involved in this operation.

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS and subcontractor personnel will provide MSDSs for all chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of all chemicals used on site will be developed using the Health and Safety Guidance Manual. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.10 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crews members will not be necessary. External communication will be accomplished by using the telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities, the FOL will determine and arrange for telephone communications.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be handled at any given time as part of this scope of work. It is also not anticipated that such spillage would constitute a danger to human health or the environment. However, as the job progresses, the potential may exist for accumulating Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters, in a central staging area. Once these fluids and other materials have been characterized, they can be removed from this area and properly disposed.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, limited areas are vulnerable to this hazard including:

- Resource deployment
- Waste transfer
- Central staging

It is anticipated that all IDW generated as a result of this scope of work will be containerized, labeled, and staged to await further analyses. The results of these analyses will determine the method of disposal.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums or in the resource deployment area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the contents will be transferred, using a hand pump, into a new vessel. The leak will be collected and contained using absorbents such as Oil-Dry, vermiculite, or sand, which are stored at the vulnerable areas in a conspicuously marked drum. This used material, too, will be containerized for disposal pending analysis. All inspections will be documented in the project logbook.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and the SSO will serve as the Spill Response Coordinators for this operation, should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that may be maintained (depending on anticipated need) at the staging areas at all times for the purpose of supporting this Spill Prevention/Containment Program.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 17-E or 17-H)
- Shovels, rakes, and brooms

10.6 SPILL CONTROL PLAN

This section describes the procedures the TtNUS field crewmembers will employ upon the detection of a spill or leak.

1. Notify the SSO or FOL immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove all non-essential personnel.

2. Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

3. Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

4. Recontainerize spills, including top cover impacted by the spill. Await test results for treatment or disposal options.

It is not anticipated that a spill will occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SSO in accordance with the procedures discussed in Section 2.0 of this HASP.

11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter any confined spaces**. A confined space is defined as an area which has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is one that:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for all chemicals brought on site, including decon solution, fuels, sample preservations, calibration gases, etc.
- Follow-up Reports (to be completed by the FOL)
- A full size OSHA Job Safety and Health Poster
- Training/Medical Surveillance Documentation Form (blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (posted) - This list represents all chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc.. This list should be posted in a central area.

Material Safety Data Sheets (MSDS) (maintained) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory

list for all substances employed on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - this poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaces, altered, or covered by other material.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The lists indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. a copy of this sheet or a wallet card will be given to all personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring (maintained) - All results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose, as stated above, is to allow site personnel quick access to this information. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirator
BGS	Below Ground Surface
C	Centigrade
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-term Environmental Action - Navy
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
CTO	Contract Task Order
CZR	Contamination Reduction Zone
dBA	Decibel
DoD	Department of Defense
DOT	Department of Transportation
DPT	Direct Push Technology
ECM	Electronic Measures Area
EPA	Environmental Protection Agency
eV	electron Volts
F	Fahrenheit
FID	Flame Ionization Detector
FOL	Field Operations Leader
GC	Gas Chromatograph
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HSM	Health and Safety Manager
IARC	International Agency for Research on Cancer
IAS	Initial Assessment Study
IDLH	Immediate Dangerous to Life or Health
IDW	Investigative Derived Waste
IP	Ionization Potential
IR	Installation Restoration
LEL/LFL	Lower Explosive Limit / Lower Flammable Limit

mg/m^3	Milligrams per cubic meter
mmHg	millimeters mercury
MSDS	Material Safety Data Sheet
msl	mean sea level
MWIRP	Naval Weapons Industrial Reserve Plant
N/A	Not Available
NIOSH	National Institute of Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAH	Polynuclear Hydrocarbons
PE	Professional Engineer
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts per Million
Pt	Point
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
SAP	Sampling and Analyses Plan
SAR	Supplied Air Respirator
SCBA	Self Contained Breathing Apparatus
SI	Site Investigation
SOP	Standard Operating Procedure
SSO	Site Safety Officer
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SVOC	Semivolatile Organic Compound
TBD	To be determined
TLV	Threshold Limit Value
PM	Project Manager
TtNUS	Tetra Tech NUS, Inc.
TWA	Time-Weighted Average
UEL/UFL	Upper Explosive Limit/Upper Flammable Limit
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WP	Work Plan

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

CASE NO. _____

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room.
- If incident involves a chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Diethorn at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours. You will be required to complete an Injury/Illness Report (attached). You may also be required to participate in a more detailed investigation from the Health Sciences Department.
- If further medical treatment is needed, The Hartford Network Referral Unit will furnish a list of network providers customized to the location of the injured employee. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work. Please call Marilyn Diethorn at (412) 921-8475 for the number of the Referral Unit.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local human resources representative, corporate health and safety coordinator, or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries (Tetra Tech or Company) pay premiums on behalf of their employees. The type of injuries or illnesses covered and the amount of benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits. All employees must follow the above injury/illness reporting procedures. Consultants, independent contractors, and employees of subcontractors are <u>not</u> covered by Tetra Tech's Worker's Compensation plan.

CASE NO. _____

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported. Please note that if you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

CASE NO. _____

TETRA TECH NUS, INC.
INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

To: Corporate Health and Safety Manager
Human Resource Administrator

Prepared by: _____

Position. _____

Project Name _____

Office: _____

Project No _____

Telephone: _____

Information Regarding Injured or Ill Employee:

Name: _____ Office: _____

Home address _____ Gender: M ☐ F ☐ No. of dependents: _____

_____ Marital status: _____

Home telephone: _____ Date of birth. _____

Occupation (regular job title): _____ Social Security No.: _____

Department. _____

Date of Accident: _____ **Time of Accident:** _____

Location of Accident Was place of accident or exposure on employer's premises Yes ☐ No ☐

Street address: _____

City, state, and zip code: _____

County: _____

Narrative Description of How Accident Occurred: (Be specific. Explain what the employee was doing and how the accident occurred)

TETRA TECH, INC.
INJURY/ILLNESS REPORT

Did employee die? Yes ☐ No ☐
Was employee performing regular job duties? Yes ☐ No ☐
Was safety equipment provided? Yes ☐ No ☐
Was safety equipment used? Yes ☐ No ☐
Note: Attach any police reports or related diagrams to this accident report

Witness(es):

Name:

Address:

Telephone

Describe the Illness or Injury and Part of Body Affected:

Name the Object or Substance which Directly Injured the Employee:

Medical Treatment Required:

☐ No ☐ Yes ☐ First Aid Only

Physician's Name: _____

Address: _____

Hospital or Office Name: _____

Address: _____

_____

Telephone No.: _____

Lost Work Days:

☐ No. of Lost Work Days _____

Last Date Worked _____

Time Employee Left Work _____

Date Employee Returned to Work _____

☐ No. of Restricted Work Days _____

☐ None

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ Time of Report: _____

	Printed Name	Signature	Telephone No.	Date
Project or Office Manager				
Site Safety Coordinator				
Injured Employee				

To be completed by Human Resources:

Date of hire: Hire date in current job:

Wage information: $ _____ per _____ (hour, day, week, or month)

Position at time of hire:

Shift hours:

State in which employee was hired:

Status: ☐ Full-time ☐ Part-time Hours per week: _____ Days per week: _____

Temporary job end date:

To be completed during report to workers' compensation insurance carrier:

Date reported: Reported by:

TeleClaim phone number:

TeleClaim account number:

Location code:

Confirmation number:

Name of contact:

Field office of claims adjuster:

ATTACHMENT II

TICK CONTROL
AND
LYME DISEASE

TICK CONTROL
AND
LYME DISEASE

The occurrence of Lyme disease has become a worldwide problem since its identification in 1976. This disease is characteristically recognized as being transmitted by ticks, which may be encountered by field personnel while working at this site. As a result, this discussion has been included with this Health and Safety Plan to provide for adequate recognition, evaluation, and control efforts to minimize the occurrence and effects of this potential hazard.

The discovery of Lyme disease is credited to Dr. Allen Steere of Yale University Medical School, and is named after the community where it was (reportedly) first encountered, Lyme, Connecticut. This disease can be transmitted to man through the bite of ticks that are infected with a cork screw-shaped microbe (spirochete) The spread of this disease has been so rapid that in 1984 it surpassed Rocky Mountain Spotted fever as the most common tick-borne disease in the United States. In this country, most of the incidents of this disease have been recorded in the Northeast, and the tick species most commonly attributed with its spread is the deer tick.

Recognition

This hazard potential exists primarily in the spring and summer months, as these are the seasons that tick populations and activity flourish. In fact, 90 percent of the reported cases have occurred from early June through September. Also, this concern exists primarily in heavily vegetated areas. Therefore, recognition of these factors can aid in the awareness and control of this threat.

To aid in the recognition and identification of these insects, an example illustration of the tick species common to the region where this site is located has been included with this discussion. This species (the American Dog tick) is common in the eastern half of the United States, and typically exists in areas covered with grass or underbrush. These insects will attach themselves to animals (including man) that pass through the area and rub against them. After finding a host, the tick inserts its mouthparts and sucks blood until it is fully engorged. This requires a time period of three to twelve days, then the tick will drop off. In addition to Lyme disease concerns, this tick has also been identified as a transmitter of Rocky Mountain Spotted Fever, and the organisms of tularemia and possibly relapsing fever. The wounds left by tick bites can be painful, and can also have a paralyzing effect commonly referred to as tick paralysis.

The earliest symptom of the onset of this disease is the occurrence of an unusual red skin rash. This is commonly the first indication since it has been evidenced that many persons who have contracted this disease were, in fact, unaware that they had been bitten. This rash can appear at the site of the bite anywhere from several days to a few weeks after the bite. It typically starts as a small red spot, and then expands as the spirochetes expand from the bite location. Rash sizes can vary, but have been most commonly associated in a 2 to 3 inch diameter size range. This rash will fade (with or without treatment) after a few weeks. Close inspection is necessary to detect this symptom as the rashes are easy to miss because they're often very faint. Body sites where rashes frequently occur include the thigh areas, groin, and armpits. Also, it is not uncommon for a rash to develop in more than one place.

Other early symptoms include profound fatigue, a stiff neck, and flu-like symptoms such as headache, chills, fever, and muscle aches. Recognition of the onset of any of these symptoms is important since tick bites do not always produce a rash. If left untreated, the disease will progress to its second stage within weeks or months after the infection. This stage involves affects to the heart and nervous system. A common second stage symptom is a paralysis on one or both sides of the face. Others include severe headache, encephalitis, or meningitis. The third and final stage involves the development of chronic inflammatory arthritis, which can occur up to a year or more after the bite.

Evaluation

Evaluation of this hazard potential principally involves field personnel performing close self-inspections for the presence of ticks each time they leave the site. This should involve careful examination, especially of the individuals' heads. Personnel should be aware that when a tick attaches itself to its host, it inserts its entire head under the surface of the skin.

Control

Control of this threat involves several components. First, field personnel must be aware of the climate and area conditions which are commonly associated with being conducive to tick infestation. Second, when working in or walking through potential infested areas, personnel must ensure that they do not have exposed body parts (i.e. at least long sleeved shirts and long pants, particularly when protective coveralls are not worn). In heavily vegetated areas where infestation is likely, Tyvek coveralls will be required to minimize this hazard potential. Also, several commercial products have been demonstrated as being effective in repelling ticks. Examples include Permanone, Off!, and Cutter. These types of repellents will be used at the direction and discretion of the Tetra Tech NUS Health and Safety Officer, and only in accordance and observation of manufacturer's recommendations. In most instances, however, such repellents are typically applied to the outside surfaces of clothing (and not directly onto the skin), and should be applied also to shoe tops, socks, pants cuffs, and other areas most susceptible to ticks.

Tick Removal

In the event that a tick is discovered to be attached to a member of the field team, timely removal of the insect is critical to reducing the potential for contracting the disease. According to available information and research, there is apparently a grace period of at least a few hours from the time of the bite before the tick transmits the microbe (the spirochetes are not present in the mouth parts of the tick). However, the incident of a tick bite is frequently unnoticed, and the discovery of the tick may not occur until after this suspected grace period has already elapsed. Therefore, timely removal is very important. The preferred method of tick removal is to pull it out using tweezers or small forceps. In this method, the tick should be grasped as close to the mouth as possible, and then pulled steadily upward. Care must be exercised so as not to pull in a jerking motion as this can result in the head becoming detached. After the tick has been removed, disinfect the bite with rubbing alcohol or povidone iodine (Betadine). The tick must not be handled as the microbes can enter the body through any breaks in intact skin. The bite should be checked occasionally for at least a two-week period to see if a rash forms. If it does, medical attention must be promptly sought.

In order to provide for proper and timely response to the occurrence of a tick bite, the SSO will ensure that the site First Aid kit is properly equipped with medical forceps and rubbing alcohol, in addition to the standard kit contents. Also, an adequate supply of commercial insect (tick) repellents will be maintained on-site, and all personnel will be trained in its proper application and will be required to use it, at the direction of FOL.

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

COMPANY: _____ **UNIT NO.** _____
FREQUENCY: Inspect daily, document prior to use and as repairs are needed.

Inspection Date: ____/____/____ Time: _____ Equipment Type: _____
(e.g., bulldozer)

	Good	Need Repair	N/A
Tires or tracks	☐	☐	☐
Hoses and belts	☐	☐	☐
Cab, mirrors, safety glass	☐	☐	☐
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	☐	☐	☐
- Is the equipment equipped with audible back-up alarms and back-up lights?	☐	☐	☐
Horn and gauges	☐	☐	☐
Brake condition (dynamic, park, etc.)	☐	☐	☐
Fire extinguisher (Type/Rating -_____)	☐	☐	☐
Fluid Levels:			
- Engine oil	☐	☐	☐
- Transmission fluid	☐	☐	☐
- Brake fluid	☐	☐	☐
- Cooling system fluid	☐	☐	☐
- Windshield wipers	☐	☐	☐
- Hydraulic oil	☐	☐	☐
Oil leak/lube	☐	☐	☐
Coupling devices and connectors	☐	☐	☐
Exhaust system	☐	☐	☐
Blade/boom/ripper condition	☐	☐	☐
Accessways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	☐	☐	☐
Power cable and/or hoist cable	☐	☐	☐
Steering (standard and emergency)	☐	☐	☐

Safety Guards:

	Yes	No
– Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? _____	☐	☐
– Hot pipes and surfaces exposed to accidental contact? _____	☐	☐
– All emergency shut offs have been identified and communicated to the field crew? _____	☐	☐
– Have emergency shutoffs been field tested? _____	☐	☐
– Results? _____	☐	☐
– Are any structural members bent, rusted, or otherwise show signs of damage? _____	☐	☐
– Are fueling cans used with this equipment approved type safety cans? _____	☐	☐

- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?_____ ❒ ❒

Portable Power Tools:

- Tools and Equipment in Safe Condition?_____ ❒ ❒
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)? ❒ ❒
- Portable electric tools properly grounded?_____ ❒ ❒
- Damage to electrical power cords?_____ ❒ ❒
- Blade guards in place?_____ ❒ ❒
- Components adjusted as per manufacturers recommendation?_____ ❒ ❒

Cleanliness:

- Overall condition (is the decontamination performed prior to arrival on-site considered acceptable)?_____
- Where was this equipment used prior to its arrival on site?_____
- Site Contaminants of concern at the previous site?_____
- Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls?_____

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)?_____
- Does the operator, understand the equipments operating instructions?_____
- Is the operator experienced with this equipment? _____
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner?_____
- Is the operator 21 years of age or more?_____

Identification:

- Is a tagging system available, for positive identification, for tools removed from service?___

Additional Inspection Required Prior to Use On-Site

	Yes	No
- Does equipment emit noise levels above 90 decibels?	❒	❒
- If so, has an 8-hour noise dosimetry test been performed?	❒	❒

- Results of noise dosimetry:_____
- Defects and repairs needed:_____
- General Safety Condition: _____
- Operator or mechanic signature:_____

Approved for Use: ❒ Yes ❒ No

_____
Site Safety Officer Signature

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT FOR MOBILIZATION AND DEMOBILIZATION ACTIVITIES AT NWIRP CALVERTON, NEW YORK

Permit No _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I Work limited to the following (description, area, equipment used) Mobilization and demobilization activities activities

II. Required Monitoring Instruments None

III. Field Crew

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions Minimum requirement include sleeved shirt and long pants, or coveralls, safety glasses and safety footwear Hard hats and hearing protection will be worn when working near operating equipment

V. Chemicals of Concern — Action Level(s) — Response Measures

None anticipated given the nature of surveying activities and limited contact w/ media.

VI. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type - Nitrile)	☐ Yes	☒ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: Tyvek coverall to protect against natrual hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake chaps to protect against bites.

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☒	Emergency alarms	☒	☐
Procedure for safe job completion	☐	☒	Evacuation routes	☒	☐
Contractor tools/equipment/PPE inspected	☐	☒	Assembly points	☒	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

IX Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR SURVEYING ACTIVITIES AT NWIRP CALVERTON, NEW YORK

Permit No _____ Date _____ Time From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Geographical surveys

II. Required Monitoring Instruments: None

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required
Full face APR ☐ Escape Pack ☐
Half face APR ☐ SCBA ☐
SKA-PAC SAR ☐ Bottle Trailer ☐
Skid Rig ☐ None ☒

Modifications/Exceptions: Minimum requirements include sleeved shirt and long pants and safety footwear. Safety glasses, hard hats, and hearing protection will be worn when working near operating equipment.

V Chemicals of Concern: None anticipated given the nature of surveying activities and limited contact w/ media.
Action Level(s): None
Response Measures: _____

VI. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No		Hearing Protection (Plugs/Muffs)	☐ Yes	☒ No
Safety Glasses	☐ Yes ☐ No		Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes ☒ No		Radio	☐ Yes	☒ No
Splash Shield	☐ Yes ☒ No		Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes ☐ No		Gloves (Type - Work)	☐ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes ☐ No		Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: Tyvek coverall to protect against natural hazards (e.g., ticks) If working in areas where snakes are a threat, wear snake chaps to protect against bites

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☒	Emergency alarms	☒	☐
Procedure for safe job completion	☐	☒	Evacuation routes	☒	☐
Contractor tools/equipment/PPE inspected	☐	☒	Assembly points	☒	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR SOIL BORING OPRATIONS AT NWIRP CALVERTION, NEW YORK

Permit No _____ Date _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Soil Boring

II Required Monitoring Instruments PID with 8.97 eV (or higher) lamp source

III Field Crew _____

IV. On-site Inspection conducted ☒ Yes ☐ No Initials of Inspector _____ _____ TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of the drill rig or other operating equipment

V.

Chemicals of Concern	Action Level(s)	Response Measures
Potential site contaminants include VOCs and SVOCs	Any sustained readings >50 ppm above background levels in worker breathing zones.	Suspend site activities and report to an unaffected area.

VI. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type - Nitrile)	☒ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths. PVC or PE coated Tyvek if saturation or work cloths may occur

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☒	☐	Emergency alarms	☒	☐
Procedure for safe job completion	☒	☐	Evacuation routes	☒	☐
Contractor tools/equipment/PPE inspected	☒	☐	Assembly points	☒	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☒ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: The TtNUS SOP on Utility Location and Excavation Clearance will be followed for all subsurface activities.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR MULTI-MEDIA SAMPLING AT NWIRP CALVERTON, NEW YORK

Permit No _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Multi media sampling including soils (surface and sub surface), sediments; groundwater and IDW.

II. Required Monitoring Instrument(s) PID with 8 97 eV (or higher) lamp source

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ _____
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required
Full face APR ☐ Escape Pack ☐
Half face APR ☐ SCBA ☐
SKA-PAC SAR ☐ Bottle Trailer ☐
Skid Rig ☐ None ☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, safety glasses and nitrile gloves Hard hats and hearing protection will be worn when working near operating equipment and or when required by the facility

V.

Chemicals of Concern	Action Level(s)	Response Measures
Site contaminants include VOCs and SVOCs	Any sustained readings > 50 ppmabove background levels in worker breathing zones.	Suspend site activities and report to an unaffected area.

VI. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	● No	Gloves (Type - Nitrile)	☒ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: Tyvek coverall if there is a potential for soiling work cloths and PVC or PE coated Tyvek if saturation or work cloths may occur Reflective vests for high traffic areas.

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☒	☐	Emergency alarms	☒	☐
Procedure for safe job completion	☐	☒	Evacuation routes	☒	☐
Contractor tools/equipment/PPE inspected	☐	☒	Assembly points	☒	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR DECONTAMINATION ACTIVITIES NWIRP CALVERTON, NEW YORK

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment and machinery (i.e., drill rigs, augers). Brushes and spray bottles will be used to decon small sampling equipment Pressure washers or steam cleaning units will be used to decon the augers and drilling.

II. Required Monitoring Instrument(s): PID with 8.97 eV (or higher) lamp source (used to screen equipment)

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ _____
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	●	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety glasses, safety footwear, and nitrile gloves. When using pressure washers, steam cleaners field crews will wear hearing protection, and face shields.

V. Chemicals of Concern / Action Level(s) / Response Measures

Chemicals of Concern	Action Level(s)	Response Measures
Site contaminants include VOCs and SVOCs and Decon Solutions	Any sustained readings > 50 ppm above background levels in worker breathing zones.	Suspend site activities and report to an unaffected area.

VI. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☒ Yes	☐ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type - Nitrile)	☒ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: PVC rain suits or PE or PVC coated Tyvek for protection against splashes and overspray. Chemical resistant boot covers if excessive liquids are generated or to protected footwear.

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☒	☐	Emergency alarms	☒	☐
Procedure for safe job completion	☐	☒	Evacuation routes	☒	☐
Contractor tools/equipment/PPE inspected	☐	☒	Assembly points	☒	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☒
Equipment purged/cleaned	☐	☒
Isolation checklist completed	☐	☒
Electrical lockout required/field switch tested	☐	☒
Blinds/misalignments/blocks & bleeds in place	☐	☒
Hazardous materials on walls/behind liners considered	☐	☒

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Chemical hazards include site contaminants and the use of fluids such as isopropyl alcohol, methanol, etc. To minimize the potential for exposure, site personnel will use PPE and prevent contact with potentially contaminated equipment. Refer to the manufacturer's MSDS regarding PPE, handling, storage, and first-aid measures related to decontamination fluids.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V

STANDARD OPERATING PROCEDURE FOR UTILITY LOCATING AND EXCAVATION CLEARANCE

TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number HS-1.0	Page 1 of 11
		Effective Date 06/99	Revision 0
		Applicability Tetra Tech NUS, Inc.	
		Prepared Health & Safety	
Subject UTILITY LOCATING AND EXCAVATION CLEARANCE		Approved D. Senovich	

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1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility service locating and excavation clearance. It is the policy of TtNUS to provide a safe and healthful work environment for the protection of our employees. The purpose of this SOP is to aid in achieving the objectives of the TtNUS Utility Locating and Clearance Policy. The TtNUS Utility Locating and Clearance Policy should be reviewed by anyone involved with underground or overhead utility services.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of methods used to determine the presence or absence of utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to development of detailed operating procedures. This guidance is not intended to provide a detailed description of methodology and operation. Specialized expertise during both planning and execution of several of the geophysical methods may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer -- A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey -- A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal detection -- A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer -- A magnetometer equipped with two sensors that are vertically separated a fixed distance apart. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

4.0 RESPONSIBILITIES

Project Manager - Responsible for ensuring that all field activities are conducted in accordance with this procedure and the TtNUS Utility Locating and Clearance Policy.

Site Manager (SM) or Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved Standards Operating Procedures or as otherwise dictated by the approved project plan(s).

Site Health & Safety Officer (HSO) – Responsible to provide technical assistance and verify full compliance with this SOP and the TtNUS Utility Locating and Clearance Policy. The HSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager and to the Project Manager.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown on client properties. The following procedure must be followed prior to beginning any excavation that might potentially be in the vicinity of underground utility services.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM is responsible for arranging for the procurement of a qualified, experienced, utility locating contractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.

2. A site inspection must be performed to compare the site plan information to actual conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation must be marked at the site in white paint or pin flags to notify personnel of the proposed excavation activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, asphalt/concrete scares and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional Information regarding utility locations shall be added to project maps upon completion of this exercise.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire on (and comply with) property owner requirements. It is important to note that private property owners may require from several days to several weeks advance notice prior to locating utilities.

4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the

particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who are to mark their respective lines within the specified time frame.

5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using such methods as passive and intrusive surveys, physical probing, or hand auguring. Each method has advantages and disadvantages including complexity, applicability, and price.

7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment and utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed with a hand augur or pole made of non-conductive material. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.

8. All uncovered utilities must be supported. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate Health and Safety Manager. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly though conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

Nominal Voltage	Minimum Clearance
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

6.1 Geophysical Methods

Geophysical methods include electromagnetics, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References in Section 6.0.

Electromagnetics

Electromagnetic (EM) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A good example of this type of geophysical equipment is an EM-61.

EM locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced EM surveys, simple magnetic locating and traced nonmetallic surveys.

When access can be gained to a conduit, a flexible insulated trace wire can also be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's) and steel utility lines. A good example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone), hence, verification is necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into

the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree. High-quality hand-held thermal imagers are available from $15,000 to $30,000, with prices decreasing as new systems are introduced.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to determine the exact horizontal and vertical location of utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand-auger Surveys

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other physical methods, borings must be hand-augured for all locations where there is a potential to impact buried utilities. Hand auguring must be performed to depths of no less than 4 feet. The minimum hand auger depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 3 presents frost line depths for the regions of the continental United States. At a minimum, hand auger depths must be at least to the frost line depth plus two (2) feet, but never less than 4 feet below ground surface (bgs). For auguring, the hole must be reamed by hand to at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand auger. It is important that a post-hole digger is not used in place of a hand augur.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, tile probes may be used instead of or in addition to hand augurs. Tile probes must be performed to the same depth requirements as hand augurs. Depending upon the site conditions and intended probe usage, tile probes should be made of non-conductive material such as fiberglass.

7.0 REFERENCES

TtNUS Utility Locating and Clearance Policy

TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction

TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys

TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES

Alabama Alabama Line Location (800) 292-8525 Tucson Blue Stake Center (800) 782-5348
Alaska Locate Call Center of Alaska Inc (800) 478-3121
Arizona Arizona Blue Stake Inc (800) 782-5348
Arkansas Arkansas One Call System Inc. (800) 482-8998
California Underground Service Alert North (800) 227-2600 Underground Service Alert South (800) 227-2600
Colorado Utility Notification Center of Colorado (800) 922-1987
Connecticut Call Before You Dig (800) 922-4455
Delaware Miss Utility of Delmarva (800) 282-8555
District of Columbia Miss Utility (800) 257-7777
Florida Call Sunshine (800) 432-4770
Georgia Utilities Protection Center Inc (800) 282-7411
Idaho Palouse Empire Underground Coordinating Council (800) 882-1974 Utilities Underground Location Center (800) 424-5555 Kootenai Country Utility Coordinating Council (800) 428-4950 Shoshone County One Call (800) 398-3285 Dig Line (800) 342-1585 One Call Concepts (800) 626-4950
Illinois Julie Inc. (800) 892-0123 Digger (Chicago Utility Alert Network) (312) 744-7000
Indiana Indiana Underground Plant Protection Services (800) 382-5544
Iowa Underground Plant Location Service Inc (800) 292-8989
Kansas

Kansas One-Call Center (800) 344-7233
Kentucky Kentucky Underground Protection Inc (800) 752-6007
Louisiana Louisiana One Call (800) 272-3020
Maine Dig Safe – Maine (800) 225-4977
Maryland Miss Utility (800) 257-777 Miss Utility of Delmarva (800) 282-8555
Massachusetts Dig Safe – Massachusetts (800) 322-4844
Michigan Miss Dig System (800) 482-7171
Minnesota Gopher State One Call (800) 252-1166
Mississippi Mississippi One-Call System Inc (800) 227-6477
Missouri Missouri One Call System Inc (800) 344-7483
Montana Utilities Underground Location Center (800) 424-5555 Montana One Call Center (800) 551-8344
Nebraska Diggers Hotline of Nebraska (800) 331-5666
Nevada Underground Service Alert North (800) 227-2600
New Hampshire Dig Safe – New Hampshire (800) 225-4977
New Jersey New Jersey One Call (800) 272-1000
New Mexico New Mexico One Call System Inc (800) 321-ALERT Las Cruces-Dona Utility Council (505) 526-0400
New York Underground Facilities Protection Organization (800) 962-7962 New York City· Long Island One Call Center (800) 272-4480
North Carolina The North Carolina One-Call Center Inc (800) 632-4949
North Dakota Utilities Underground Location Center (800) 795-0555
Ohio Ohio Utilities Protection Service (800) 362-2764

Oil & Gas Producers Underground Protection Service (800) 925-0988

Oklahoma
Call Okie (800) 522-6543

Oregon
Utilities Underground Location Center (800) 424-5555

Douglas Utilities Coordinating Council (503) 673-6676

Josephine Utilities Coordinating Council (503) 476-6676

Rogue Basin Utility Coordinating Council (503) 779-6676

Utilities Notification Center (800) 332-2344

Pennsylvania
Pennsylvania One Call System Inc (800) 242-1776

Rhode Island
Dig Safe – Rhode Island (800) 225-4977

South Carolina
Palmetto Utility Protection Service Inc. (800) 922-0983

South Dakota
South Dakota One Call (800) 781-7474

Tennessee
Tennessee One-Call System (800) 351-1111

Texas
Texas One Call System (800) 245-4545

Texas Excavation Safety System (800) 344-8377

Lone Star Notification Center (800) 669-8344

Utah
Blue Stakes Location Center (800) 662-4111

Vermont
Dig Safe – Vermont (800) 225-4977

Virginia
Miss Utility of Virginia (800) 552-7001

Miss Utility (800) 257-7777

Miss Utility of Delmarva (800) 441-8355

Washington
Utilities Underground Location Center (800) 424-5555

Grays Harbor & Pacific County Utility Coordinating Council (206) 535-3550

Utilities County of Cowlitz County (360) 425-2506

Chelan-Douglas Utilities Coordinating Council (509) 663-6111

Upper Yakima County Underground Utilities Council (800) 553-4344

Inland Empire Utility Coordinating Council (509) 456-8000

Palouse Empire Utilities Coordinating Council (800) 822-1974

Utilities Notification Center (800) 332-2344

West Virginia
Miss Utility of West Virginia Inc (800) 245-4848

Wisconsin
Diggers Hotline Inc (800) 242-8511

Wyoming
West Park Utility Coordinating Council (307) 587-4800

Call-In Dig-In Safety Council (800) 300-9811

Fremont County Utility Coordinating Council (800) 489-8023

Central Wyoming Utilities Coordinating Council (800) 759-8035

Southwest Wyoming One Call (307) 362-8888

Carbon County Utility Utility Coordinating Council (307) 324-6666

Albany County Utility Coordinating Council (307) 742-3615

Southeast Wyoming Utilities Coordinating Council (307) 638-6666

Wyoming One-Call (800) 348-1030

Utilities Underground Location Center (800) 454-5555

Converse County Utility Coordination Council (800) 562-5561

ATTACHMENT 2
UTILITY CLEARANCE FORM

Project No.: _____ Completed by: _____

Site Location: _____ Work Date: _____

Excavation Method/Overhead Equipment: _____

			Circle One		
1.	Underground Utilities				
	a)	Review of existing maps?	yes	no	N/A
	b)	Interview local personnel?	yes	no	N/A
	c)	Site visit and inspection?	yes	no	N/A
	b)	Excavation areas marked in the field?	yes	no	N/A
	e)	Utilities located in the field?	yes	no	N/A
	f)	Located utilities added to site maps?	yes	no	N/A
	g)	State One-Call agency called?	yes	no	N/A
		Caller: _____			
		Ticket Number: _____ Date: _____			
	h)	Geophysical survey performed?	yes	no	N/A
		Survey performed by: _____			
		Method: _____ Date: _____			
	i)	Hand auguring performed?	yes	no	N/A
		Auguring completed by: _____			
		Total depth: _____ feet Date: _____			
	j)	Trench/excavation probed?	yes	no	N/A
		Probing completed by: _____			
		Depth/frequency: _____ Date: _____			

			Present		Absent
2.	Overhead Utilities				
	a)	Determination of nominal voltage	yes	no	N/A
	b)	Marked on site maps	yes	no	N/A
	c)	Necessary to lockout/insulate/re-route	yes	no	N/A
	d)	Document procedures used to lockout/insulate/re-route	yes	no	N/A
	e)	Minimum acceptable clearance (SOP Section 5.2): _____			

6. Approval:

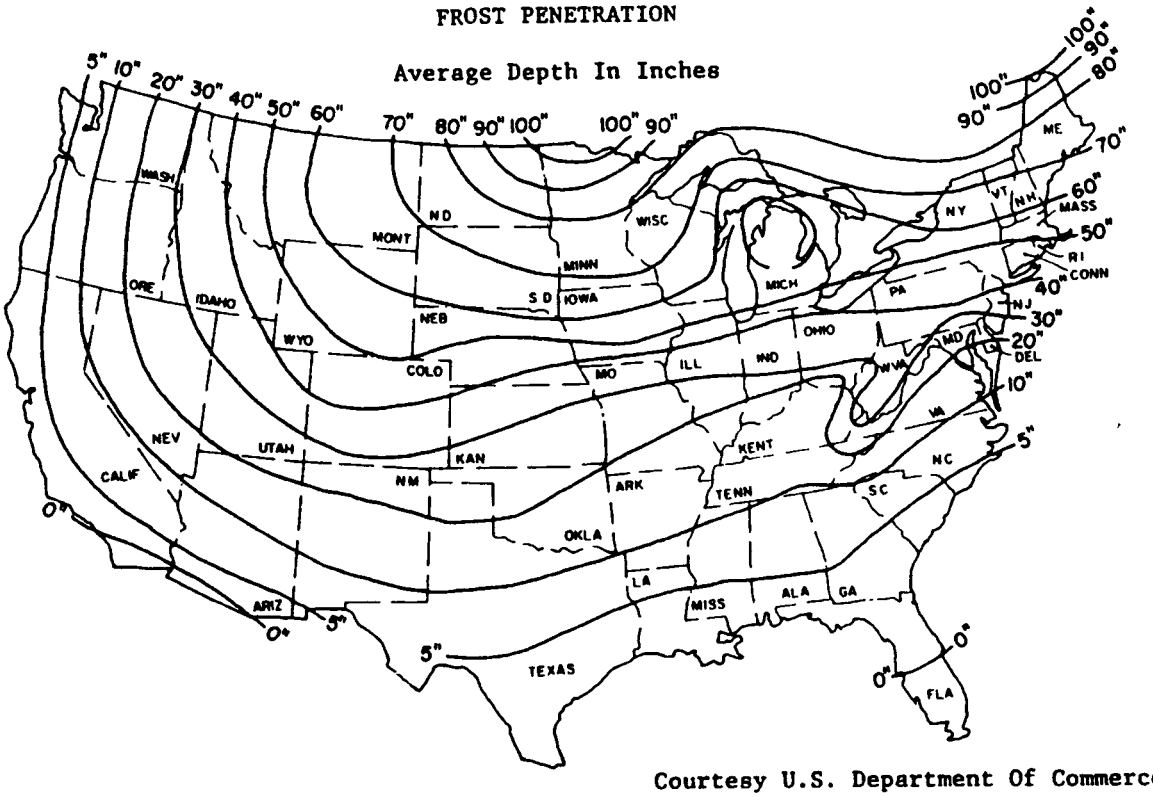
_____ _____

Site Manager/Field Operations Leader Date

cc: PM/Project File
Program File

ATTACHMENT 3

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

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19.44.06.0002

Letter Work Plan

for

Site 6A – Fuel Calibration Area and the Southern Area

Naval Weapons Industrial Reserve Plant

Calverton, New York

Northern Division
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298

Delivery Order 033

May 2000

TETRA TECH NUS, INC.

1.0 INTRODUCTION

This Letter Work Plan for the Supplemental Sampling at Site 6A (Fuel Calibration Area) and the Southern Area at Naval Weapons Industrial Reserve Plant (NWIRP) in Calverton, New York, has been prepared under Contract Task Order (CTO) 270 by TetraTech NUS, Inc., (TtNUS) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-90-D-1298. The purpose of this Letter Work Plan is to describe the field sampling and analysis activities for additional sampling activities at Site 6A and the Southern Area, the field activities for a groundwater flow study, and natural attenuation evaluation of groundwater for the Southern Area.

1.1 OBJECTIVE AND SCOPE

The objectives of this investigation are to further characterize the southern extent of the solvent-type contamination plume from NWIRP Calverton in the Southern Area; determine if the plume is discharging to the Peconic River; and determine if biological degradation of contaminants is occurring and the rate of biodegradation and other attenuation factors relative to groundwater flow.

The field activities will be conducted in two steps. The scope of Step 1 includes installing temporary monitoring wells and piezometers, sampling and analyzing groundwater from the temporary wells, and measuring water levels in the piezometers and the Peconic River to determine hydraulic gradients in the Southern Area. Step 2 will include sampling of four existing wells or piezometers for natural attenuation evaluation and abandonment of the piezometers.

1.2 PLAN FORMAT

Section 1.0 of this plan presents this brief introduction. Section 2.0 describes the field tasks and methodologies in detail. Table 2-1 provides a summary of the field tasks with rationale. Table 2-2 summarizes the sampling program and identifies sampling locations and sample identification numbers. Table 2-3 provides a summary of temporary well and piezometers depths and split-spoon and groundwater sample depths and frequencies. Table 2-4 summarizes analytical methods; bottleware, preservation requirements, and, holding times; and, the number of environmental sample and quality assurance (QA) and quality control (QC) samples. Figure 2-1 illustrates the site plan and proposed monitoring well locations.

1.3 SCHEDULE

Step 1 field activities will begin in April 2000, concurrently with Step 2 of the Site 7 Natural Attenuation Evaluation (CTO 189) field activities. Step 2 for this investigation will begin following evaluation of the Step 1 analytical results. The proposed start date for implementation of this workplan for the Southern Area sampling will be directly related to the time that it takes to obtain the proper site access agreements from landowners in order to enter their property for the purpose of the conducting the investigation described in this workplan

2.0 FIELD TASKS

2.1 STEP 1 TASKS

2.1.1 Temporary Well Installation and Groundwater Profile Sampling

Eight temporary wells (4 at Site 6A, 1 south of Site 10B, and 3 in the Southern Area) will be installed and sampled at depth for profiling of groundwater contamination. Temporary well locations are illustrated on Figure 2-1. Sample numbers, depths, analyses and rationale are provided in Table 2-1 and 2-2. Table 2-3 provides a summary of temporary well depths and split-spoon and groundwater sampling intervals and depths. All groundwater samples from the temporary wells will be analyzed for VOCs by GC with quick-turnaround times at a local, contract laboratory.

The temporary well borings will be advanced using hollow stem auger (HSA) drilling techniques. Groundwater samples will be collected from the temporary well borings at multiple depths to provide a vertical profile of groundwater contamination. Several methods may be used for collection of representative groundwater samples of the formation at depth. Several methodologies used in past investigations include the following:

1) A Direct Push Technology (DPT) sampling point capable of water sample collection will be lowered through the center of the augers and advanced a distance of approximately 5 feet below the bottom of the lead auger. The sample point will have a retractable opening that fills with water once the sample depth is reached and closes during recovery until being raised to the ground surface. Drilling will then continue until the next sampling interval is reached.

2) A slotted lead HSA will be advanced to the desired sampling depth. Once the depth is reached, a submersible pump will be lowered through the center of the augers to the slotted section of the hollow stem auger. A sufficient volume of groundwater will be evacuated (minimum 3 volumes of boring interval), and the sample will be collected directly from the pump outlet. The pump will be removed and decontaminated, and the boring will be advanced to the next sample depth.

3) An HSA with a removable center plug will be advanced to the desired sample depth. Once the sample depth is reached, the plug will be removed, and a 2-inch diameter, PVC well screen and riser pipe will be lowered through the center of the augers to the bottom of the boring. The auger will be retracted until the well screen is exposed to the surrounding formation. A submersible pump will be lowered into the well, and a sufficient volume of groundwater will be evacuated (minimum 3 volumes of boring interval). The sample will be

collected directly from the pump outlet. The pump and screen will be removed and decontaminated, and the boring will be advanced to the next sample depth.

The water level in the well and water quality parameters of the purge water will be measured at an interval of 5 to 10 minutes during purging. Water quality parameters of pH, specific conductivity, temperature, dissolved oxygen, turbidity, salinity, and Eh/ORP will be measured during purging. Water quality parameters will be measured using a water quality meter with a flow-through or slow-over cell. A minimum of three well casing volumes will be removed prior to sampling. Following purging, groundwater samples will be collected from the wells. Sample containers for VOCs will be filled directly from the pump discharge of the submersible pump (in contrast to being collected using the "soda straw" method for a peristaltic pump, as described in Section 2.1.2). The groundwater samples will be analyzed for VOCs by GC with quick-turnaround times at a local, contract laboratory.

Additionally, groundwater from existing wells FC-MW02S and FC-MW02I will be sampled for VOCs by GC with quick turnaround times at a local, contract laboratory. Purging and sampling will be the same procedure as stated above.

All purge and sampling information will be recorded on purge data sheets and groundwater sample logsheets, respectively.

All purge water will be containerized, transported and temporarily stored in the existing polytank at NWIRP Calverton, as per Section 2.5.

Upon temporary well completion, all temporary well borings will be grouted with a bentonite / cement slurry using a tremie pipe from the bottom of the boring to the ground surface.

2.1.2 Piezometer Installation and Groundwater Sampling

Twelve temporary piezometers will be installed to collect groundwater head data to determine groundwater flow gradients in the Southern Area and to collect groundwater samples for quick-turnaround VOC analyses to profile ground contamination at depth. The piezometers will be grouped in four clusters of three piezometers, installed at shallow, intermediate, and deep depths. Piezometer locations are illustrated on Figure 2-1. If a low-permeability unit (i.e., clay layer) is encountered at depth (approximately 60 feet) at a piezometer cluster, The intermediate piezometer will be installed above the unit, and the deep piezometer will be installed below it and sealed from the aquifer above by cement/bentonite grout seal .

The piezometer borings will be advanced using HSA drilling techniques. The HSA will have an inside diameter (I.D.) of at least 3-1/4 inches to accommodate split-spoon sampling for lithology classification during advancement. Two-inch diameter split-spoon samples will be collected at the depths and frequencies summarized in Table 2-3. The deep piezometer for each cluster will be logged using a geophysical probe (i.e., natural gamma ray probe) to identify any clay layer below the depth of the intermediate piezometer. The geophysical logs will be correlated to the intermediate piezometer soil logs to confirm interpretation.

All drilling cuttings from the piezometers will be spread out at the associated piezometer locations.

After advancement to the target depth, the piezometer screen and riser pipe will be installed through the center of the drilling tools. The HSA will be retracted from the boring to a depth of 10 feet above the piezometer screen, and the boring formation will be allowed to collapse around the piezometer screen. The remainder of the boring annulus will be backfilled with a bentonite grout using a tremie pipe. The depths of all backfilled materials will be constantly monitored during the piezometer installation process by means of a weighted tape measure.

All piezometers will be constructed of 1-inch I.D., Schedule 40 PVC, flush-joint, flush-threaded riser pipe and factory-slotted well screen. All well construction materials shall be National Sanitation Foundation-approved and provided in certified clean packaging. Piezometer screens will be 5 feet in length and have slot sizes of 0.02 inches. A lockable, expandable J-plug type cap will be placed over each riser pipe.

Groundwater from the twelve piezometers will be sampled during Step 1 for quick-turnaround VOCs analyses by GC at a local, contract laboratory. The wells will be purged prior to sampling using a peristaltic pump. The tubing will be disposable high disposable polyethylene (HDPE), and the tubing intake will be placed at approximately the middle of the saturated screen. The flow rate will be approximately 0.5 to 1.5 gallons per minute (gpm). The water level in the well and water quality parameters of the purge water will be measured at an interval of 5 to 10 minutes during purging. The water quality parameters will consist of pH, specific conductivity, temperature, dissolved oxygen, turbidity, salinity, and Eh/ORP. Water quality parameters will be measured using a water quality meter with a flow-through or slow-over cell. A minimum of three well casing volumes will be removed prior to sampling. All purge water will be containerized, transported and temporarily stored in the existing polytank at NWIRP Calverton, as per Section 2.5.

Following purging, groundwater samples will be collected from the wells. Sample containers for VOCs will be filled using the "soda straw" method: the pump will be shutoff, the tubing discharge crimped, the tubing withdrawn from the well, and the sample containers filled from the intake end of the tubing while the other end is uncrimped. The process may be repeated to acquire sufficient volume to fill the sample containers. The groundwater samples will be analyzed for VOCs by GC with quick-turnaround times at a local, contract laboratory.

All purge and sampling information will be recorded on purge data sheets and groundwater sample logsheets, respectively.

A reference notch at the top of piezometer will be surveyed for horizontal location and elevation.

The piezometers will abandoned as described in Section 2.2.2.

2.1.3 River Gauge Installation

Two river gauges (RG-1 and RG-2) will be installed downstream (east) of Connecticut Avenue to measure the surface water elevation of the Peconic River to aid in determination of hydraulic gradients between the groundwater and the river. Locations for the gauges are illustrated in Figure 2-1. River gauge RG-1 will be installed in the river near piezometer cluster SA-PZ102S,I,D, and river gauge RG-2 will be installed in the river near piezometer cluster SA-PZ104S,I,D.

The gauges may be constructed of a heavy gauge, ¾- to 1-inch pipe (PVC or steel) or 2-inch slotted PVC screen (i.e., a stilling water), driven sufficiently into the river bottom as not to shift during its operational use. A surveyed, reference mark at the top of the pipe will be the measuring point for water level measurements. For the narrow, non-slotted pipe measurements will be taken from the outside of the pipe, whereas the slotted pipe may have water level measurements taken from the inside or outside.

2.1.4 Water Level Measurements

Two to three rounds of water level will be measured in the twelve piezometers and the two river gauges in the Southern Area (Figure 2-1). The number of rounds will be dependent on whether the initial water level measurement round provides sufficient hydraulic head data to accurately determine vertical hydraulic gradients in the Southern Area.

Water levels will be measured using an electronic water level/free product indicator to 0.01 feet. The measurements will be taken within an 8-hour period, no sooner than 1 week after installation the piezometer clusters, and no sooner than 48 hours after a significant rainfall event (1.0 inches). Measurements will be recorded on a water level measurement logsheet.

2.2 STEP 2 TASKS

2.2.1 Groundwater Sampling for Natural Attenuation Evaluation

Groundwater at three existing wells (FC-MW01S, FC-MW02S and FC-MW03S) and two temporary wells or piezometers (to be determined) will be sampled for natural attenuation parameters and VOCs. The sample locations for the temporary wells or piezometers will be determined based on the results of the Step 1 analytical results. The sample analyses and rationale for the five sample locations are summarized in Table 2-2.

[Note: As noted in the guidance *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents In Ground Water* (USEPA, September 1998), hydrogen is an "optional specialized analysis". The analysis of hydrogen for evaluation of natural attenuation processes involves a complex field extraction using a glass, bubble-strip sampler. In order to perform the field extraction, the method requires approximately 30 additional minutes of groundwater purging at a flow rate of 300 ml/minute. In addition, a very limited number of analytical laboratories are capable of performing the innovative analysis, and the current level of quality assurance using the method is very low.

In the majority of aquifer systems, an evaluation of available electron donors and acceptors is sufficient to determine the terminal electron acceptor process (TEAP) that is responsible for the site-specific biodegradation processes. There are some site where the relationship is not straightforward and the collection of hydrogen may be warranted. However, based on the current cost and low quality assurance of the current methodology, it is recommended that hydrogen not be collected unless otherwise required based on site-specific conditions.]

The wells will be purged prior to sampling using a peristaltic pump. The tubing will be disposable high disposable polyethylene (HDPE), and the tubing intake will be placed at approximately the middle of the saturated screen. Care will be taken during tubing installation as to minimize disturbance to the water for accurate measurement of parameters and minimize suspension of any fine particles in the well, which would influence turbidity. The flow rate will be approximately 0.5 to 1.5 gallons per minute (gpm). The water level in the well and water quality parameters of the purge water will be measured at an interval of 5 to 10 minutes during purging. The water

quality parameters will consist of pH, specific conductivity, temperature, dissolved oxygen, turbidity, salinity, and Eh/ORP. Water quality parameters will be measured using a water quality meter with a flow-through or slow-over cell. A minimum of three well casing volumes will be removed prior to sampling. Turbidity readings of less than 1 NTU, or stabilization (±10%) of consecutive readings for turbidity values greater than 1 NTU, should also be achieved prior to sampling. All purge water will be containerized, transported and temporarily stored in the existing polytank at NWIRP Calverton, as per Section 2.5.

Following purging, groundwater samples for VOCs analyses by GC/MS will be collected from the wells. Sample containers for VOCs will be filled using the "soda straw" method: the pump will be shutoff, the tubing discharge crimped, the tubing withdrawn from the well, and the sample containers filled from the intake end of the tubing while the other end is uncrimped. The process may be repeated to acquire sufficient volume to fill the sample containers.

All purge and sampling information will be recorded on purge data sheets and groundwater sample logsheets, respectively.

If it is determined additional temporary wells are required to satisfy the rationale in Table 2-2, these new temporary well will be installed with PVC riser and screen, as described Section 2.1.1.

All purge water will be handled as described in Section 2.5.

2.2.2 Piezometer Abandonment

All piezometers will be abandoned after the completion of the water level measurement round and the groundwater sampling for natural attenuation parameters. The shallow and intermediate depth piezometers will be abandoned by removal of the well casing and screen from the borings and the remaining annulus backfilled with a cement/bentonite grout. The piezometers will be filled with a thin grout slurry prior to removal of the well pipe in the event that it breaks off during removal. The deep depth piezometers will be grouted in place without removal of the well pipe. The casing for the deep depth piezometers will be cutoff approximately 1 to 2 feet below grade, and the surface restored to surrounding conditions (i.e., grass or asphalt). Grout will be backfilled using a tremie pipe.

2.3 SAMPLE DESIGNATION, HANDLING, AND ANALYSIS

All samples will be identified with a unique sample number. The sample number will consist of up to five parts, including the site identifier, media type, well number, sample depth, and year. An example sample number is provided below with explanation.

e.g., FC-GW04-160-00

where, FC = site identifier (Fuel Calibration Area)
GW = media type (groundwater)
04 = temporary well FC-TW04
160 = 160 feet below grade
00 = Year 2000.

QA samples (trip blanks and field duplicates) will be designated by media type and QA type with the date collected

e.g., GWFD-041500 would be the groundwater field duplicate collected on April 15, 2000
GWTB-041500 would the trip blank collected on the same day.

Sample analyses, bottleware, preservation, and holding times are provided in Table 2-4.

2.5 INVESTIGATION-DERIVED WASTE HANDLING

Several types of investigation-derived waste (IDW) are anticipated to be generated during this fieldwork. They include soil cuttings, well development water, purge water, decontamination water, and used personal protective equipment (PPE). Soil cuttings from temporary well and piezometer installation will be spread in the area immediately surrounding the associated source boring, unless elevated PID readings or visual observations indicate contamination. In such a case, contaminated soil cuttings will be containerized and temporarily stored on-site for disposal off-site.

All development water, purge water, and decontamination water in be collected and transported to the existing on-site holding tank. One sample will be collected from the holding tank for off-site disposal characterization.

Used PPE (gloves, Tyvek coveralls, etc.) will rinsed and then double-bagged and disposed in NWIRP trash receptacles.

2.6 DECONTAMINATION

All drilling equipment (i.e., split spoon samplers and augers) along with any part of the drilling rig which comes in contact with the site soil will be decontaminated using a high-pressure steam wash prior to commencing drilling, between locations, and prior to leaving the site. Split-spoon samplers and pumps will also be decontaminated between samples using Alconox/Liquinox® detergent wash and analyte-free water rinse. All decontamination fluids will be collected and stored in the existing holding tank.

Water quality meters and water level/free product indicators will be rinsed with deionized water between measurements in wells.

2.7 QUALITY ASSURANCE (QA) /QUALITY CONTROL (QC)

2.7.1 Equipment Calibration

Field instruments (water quality meters and PIDs) will be calibrated according to manufacturer's recommendations and at a frequency recommended by the manufacturer.

2.7.2 QA/QC Samples

The frequency and type of QA/QC samples is summarized in Table 2-4.

TABLE 2-1

FIELD TASKS SUMMARY
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 1 of 2

STEP	ACTIVITY	SAMPLE ANALYSES	RATIONALE
1	**Site 6A** **Temporary Well Installation and Groundwater Profile Sampling** • 5 temporary wells – 18 groundwater samples (3 samples from 4 wells and 6 samples from 1 well)	• VOCs • Lithology	Collect additional data to characterize VOC contaminant plume vertically around Sites 6A and 10B.
	Southern Area **Temporary Well Installation and Groundwater Profile Sampling** • 3 temporary wells – 15 groundwater samples (5 samples per well)	• VOCs • Lithology	Collect additional data to characterize VOC contaminant plume laterally and vertically in Southern Area and determine hydraulic relationship of Peconic River and groundwater.
	Piezometer Installation • 12 piezometers [4 clusters of 3 piezometers (shallow, intermediate, and deep depths)]	• VOCs • Lithology	
	Additional Step 1 Activities: **River Gauge Installation** • 2 River Gauges along Peconic River		
	Water Level Measurement		

TABLE 2-1 (Continued)
FIELD TASKS SUMMARY
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 2 of 2

STEP	ACTIVITY	SAMPLE ANALYSES	RATIONALE
2	**Site 6A/Southern Area** **Groundwater Sampling** • 5 existing or temporary wells or piezometers – 5 groundwater samples (1 sample from each well) **Temporary well and piezometer abandonment**	• VOCs, Natural Attenuation Parameters	Collect chemical and geochemical data for natural attenuation evaluation of plume.

Notes:

VOCs = volatile organic compounds.

TABLE 2-2

SUMMARY OF SAMPLE PROGRAM
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK

STEP	WELL NUMBER	SAMPLE IDENTIFICATION[1]	SAMPLE DEPTH (feet bgs)	SAMPLE ANALYSES	RATIONALE
1	FC-TW-04	FC-GW04-160-00 FC-GW04-180-00 FC-GW04-200-00	160 180 200	VOCs (quick-turn)	Characterize plume at depth in source area, at existing location FC-TW02/MW02
	FC-TW-09	FC-GW09-160-00 FC-GW09-180-00 FC-GW09-200-00	160 180 200	VOCs (quick-turn)	Characterize plume at depth downgradient along centerline
	FC-TW-20	FC-GW20-100-00 FC-GW20-120-00 FC-GW20-140-00 FC-GW20-160-00 FC-GW20-180-00 FC-GW20-200-00	100 120 140 160 180 200	VOCs (quick-turn)	Provide groundwater quality data at depth upgradient of Site 6A and along western property line
	FC-TW-21	FC-GW21-60-00 FC-GW21-80-00 FC-GW21-100-00	60 80 100	VOCs (quick-turn)	Characterize plume at depth downgradient along centerline; at existing location FC-MW05S/I
	ET-TW-04[2]	FC-GW09-60-00 FC-GW09-80-00 FC-GW09-100-00	60 80 100	VOCs (quick-turn)	Characterize plume at depth downgradient along centerline, near southern property line
	FC-MW02S	FC-GW02S-00	Water table	VOCs (quick-turn)	Characterize plume in source area
	FC-MW03S	FC-GW03S-00	Water table	VOCs (quick-turn)	Characterize plume in source area
	SA-TW-11G	SA-GW113-05-00 SA-GW113-20-00 SA-GW113-40-00 SA-GW113-60-00 SA-GW111-80-00	5 or water table 20 40 60 80	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-101S	SA-PZ101S-05-00	5-10	VOCs (quick-turn)	Characterize plume in Southern area, downgradient terminus of plume
	SA-PZ-101I	SA-PZ101I-50-00	50-55	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume

TABLE 2-2 (Continued)
SUMMARY OF SAMPLING PROGRAM
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 2 of 3

STEP	WELL NUMBER	SAMPLE IDENTIFICATION[1]	SAMPLE DEPTH (feet bgs)	SAMPLE ANALYSES	RATIONALE
1 (Cont.)	SA-PZ-101D	SA-PZ101D-70-00	75-80	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-102S	SA-PZ102S-05-00	5-10	VOCs (quick-turn)	Characterize plume in Southern area, downgradient terminus of plume
	SA-PZ-102I	SA-PZ102I-50-00	50-55	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-102D	SA-PZ102D-70-00	75-80	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-103S	SA-PZ103S-05-00	5-10	VOCs (quick-turn)	Characterize plume in Southern area, downgradient terminus of plume
	SA-PZ-103I	SA-PZ103IS-50-00	50-55	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-103D	SA-PZ103D-70-00	75-80	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-104S	SA-PZ104S-05-00	5-10	VOCs (quick-turn)	Characterize plume in Southern area, downgradient terminus of plume
	SA-PZ-104I	SA-PZ104I-50-00	50-55	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
	SA-PZ-104D	SA-PZ104D-70-00	75-80	VOCs (quick-turn)	Characterize plume at depth in Southern area, downgradient terminus of plume
2	FC-MW01S	FC-GW01S-15-00	Water table	VOCs, Natural Attenuation Parameters[3]	Upgradient of plume (reference location)
	FC-MW02S	FC-GW02S-15-00	Water table	VOCs, Natural Attenuation Parameters[3]	Center of plume
	FC-MW03S	FC-GW03S-15-00	Water table	VOCs, Natural Attenuation Parameters[3]	Downgradient, center of plume
	TBD	XX-GWXX-XX-00	TBD	VOCs, Natural Attenuation Parameters[3]	Downgradient, center of plume, near Peconic River with VOCs detected during Step 1
	TBD	XX-GWXX-XX-00	TBD	VOCs, Natural Attenuation Parameters[3]	Downgradient, center of plume, near Peconic River with VOCs nondetected during Step 1

VOCs = volatile organic compounds
TBD = to be determined

[1] Sample identification includes four section
AA- = site name [Fuel Calibration (FC), Engine Test House (ET), or Southern Area (SA)]
GWNN = media type (groundwater) and alphanumeric temporary well number
-NN = sample profile depth

TABLE 2-2 (Continued)
SUMMARY OF SAMPLING PROGRAM
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 3 of 3

-NN = year
(XX = TBD)

[2] Location downgradient of Site 10B-Engine Test House.
[3] Natural attenuation parameters include ethene, ethane, methane, dissolved iron and manganese, alkalinity, BOD, COD, TOC, chloride, nitrate, nitrite, orthophosphate, sulfate, sulfide and field-measured parameters of carbon dioxide, dissolved oxygen, dissolved ferrous iron, hydrogen sulfide, pH, temperature, specific conductivity, and Eh.

TABLE 2-3

WELL/PIEZOMETER INSTALLATION SUMMARY
SUPPLEMENTAL SAMPLING
SITE 6A-FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK

Temporary Well/ Piezometer Number	Total Depth (feet bls)	Screen Interval (feet bls)	Split Spoon Samples		Groundwater sample	
			Total Number	Interval (feet bls) @ Frequency (feet)	Total Number	Interval (feet bls) @ Frequency (feet)
SITE 6A						
FC-TW04	200	NA	9	160-200 @ 5	3	160-200 @ 20
FC-TW09	200	NA	9	160-200 @ 5	3	160-200 @ 20
FC-TW20	200	NA	21	100-200 @ 5	6	100-200 @ 20
FC-TW21	100	NA	9	60-100 @ 5	3	60-100 @ 20
ET-TW06	100	NA	9	60-100 @ 5	3	60-100 @ 20
SOUTHERN AREA						
SA-TW111	80	NA	17	0-80 @ 5	5	5-80 @ 20
SA-TW112	80	NA	17	0-80 @ 5	5	5-80 @ 20
SA-TW113	80	NA	17	0-80 @ 5	5	5-80 @ 20
SA-PZ101S	10	5-10	0	0	1[3]	5-10
SA-PZ101I	60	50-55[1]	9	0-40 @ 5	1[3]	50-60
SA-PZ101D	80	75-80[1]	0	GR[2] @ 0-80	1[3]	70-80
SA-PZ102S	10	5-10	0	0	1[3]	5-10
SA-PZ102I	60	50-55[1]	9	0-40 @ 5	1[3]	50-60
SA-PZ102D	80	75-80[1]	0	GR[2] @ 0-80	1[3]	70-80
SA-PZ103S	10	5-10	0	0	1[3]	5-10
SA-PZ103I	60	50-55[1]	9	0-40 @ 5	1[3]	50-60
SA-PZ103D	80	75-80[1]	0	GR[2] @ 0-80	1[3]	70-80
SA-PZ104S	10	5-10	0	0	1[3]	5-10
SA-PZ104I	60	50-55[1]	9	0-40 @ 5	1[3]	50-60
SA-PZ104D	80	75-80[1]	0	GR[2] @ 0-80	1[3]	70-80

TW = temporary well
PZ = piezometer
bls = below land surface

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[1] Actual depths of screen intervals for intermediate and deep piezometers dependent upon depth of clay layer (if encountered)
[2] GR = natural gamma ray log only, no split-spoon samples
[3] Collected during Step 2

TABLE 2-4

SUMMARY OF GROUNDWATER ANALYTICAL PROGRAM
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 1 of 2

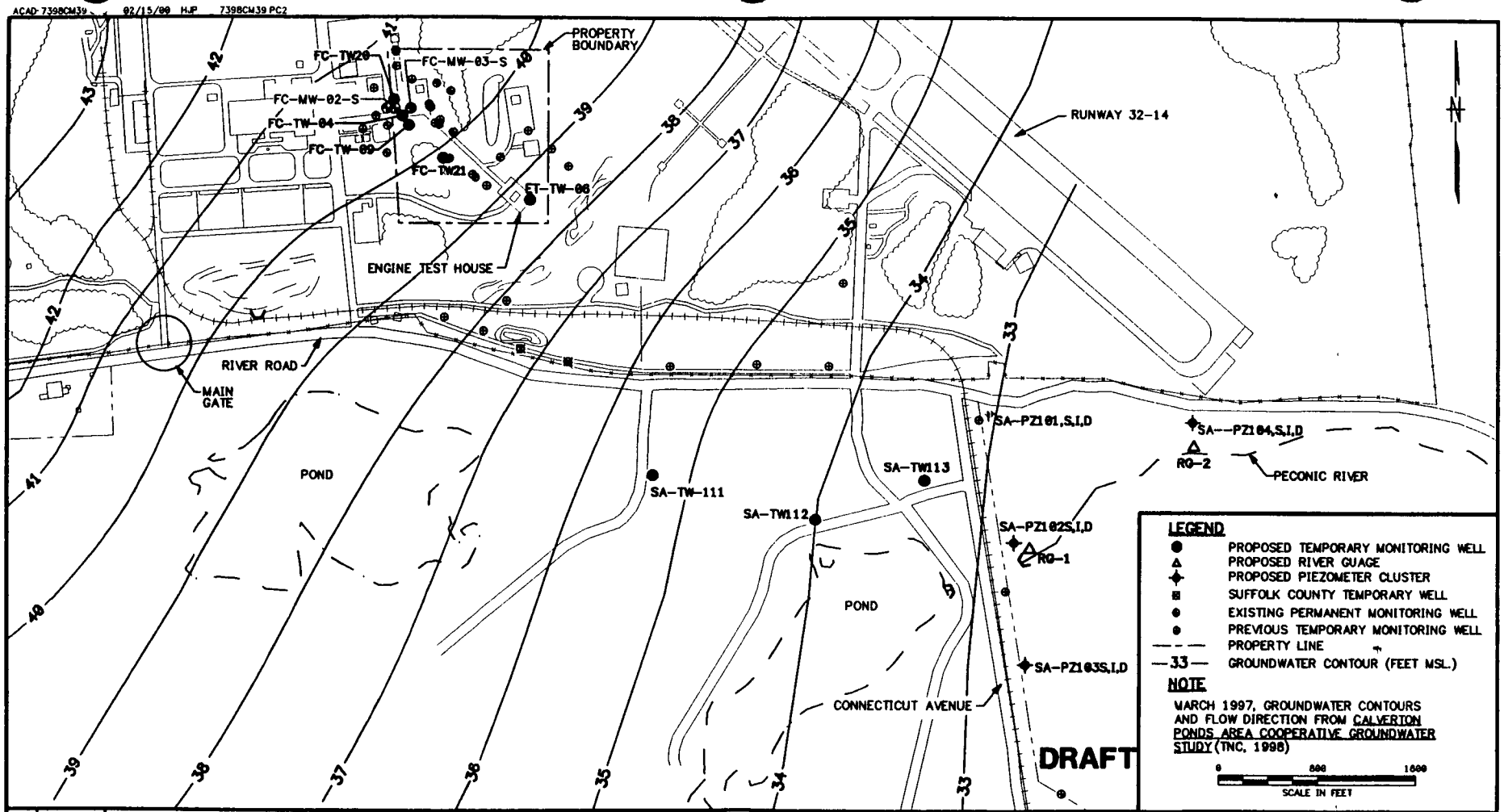
ANALYSIS	METHOD	BOTTLEWARE[1]	PRESERVATION	HOLDING TIME	NUMBER OF SAMPLES	TRIP BLANK[2]	DUPLICATE[3]	MS/MSD[4]	TOTAL NUMBER OF SAMPLES[5]
FIXED-BASE LABORATORY ANALYSES									
Volatile Organic Compounds (VOCs)	CLP OLM03 2	3 x 40 mL glass vial	HCl, pH<2, 4ºC	14 days	5	2	1	1	8
VOCs (GC)	SW-846 8021B	3 x 40 mL glass vial	HCl, pH<2, 4ºC	14 days	47	10	5	3	62
Ethene, Ethane, Methane	RSK SOP 147, 175	1 x 40 mL glass vial	HCl, pH<2, 4ºC	14 days	5	--	1	--	6
Iron, Manganese (Dissolved)	SW-846 6010B	1 x 1L HDPE	HNO_3, pH<2, 4ºC	6 months	5	--	1	--	6
Alkalinity	EPA 310.1 (Manual Titrimetric)	100-250 mL in glass or HDPE	4ºC	14 days	5	--	1	--	6
Biological Oxygen Demand (BOD) (5-day)	EPA 405 1	1 x 2L HDPE	4ºC	48 hours	5	--	--	--	6
Chemical Oxygen Demand (COD)	EPA 410 1	1 x 125 mL HDPE	H_2SO_4, pH<2, 4ºC	28 days	5	--	--	--	6
Total Organic Carbon (TOC)	EPA 415 1	1 x 125 mL amber glass	H_2SO_4, pH<2, 4ºC	28 days	5	--	--	--	6
Chloride (Cl^-)[6]	EPA 300	250 mL in HDPE	4ºC	48 hours	5	--	1	--	6
Nitrate (NO_3^-)[6]	EPA 300	250 mL in HDPE	4ºC	48 hours	5	--	1	--	6
Nitrite (NO_2^-)[6]	EPA 300	250 mL in HDPE	4ºC	48 hours	5	--	1	--	6
Orthophosphate (PO_4)[6]	EPA 300	250 mL in HDPE	4ºC	48 hours	5	--	1	--	6
Sulfate (SO_4^{2-})[6]	EPA 300	250 mL in HDPE	4ºC	28 days	5	--	1	--	6
Sulfide (S^{2-})	EPA 376 1	1L HDPE	NaOH to pH>12	7 days	5	--	1	--	6

TABLE 2-4 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL PROGRAM
SUPPLEMENTAL SAMPLING
SITE 6A – FUEL CALIBRATION AREA AND SOUTHERN AREA
NWIRP CALVERTON, CALVERTON, NEW YORK
PAGE 2 of 2

ANALYSIS	METHOD	BOTTLEWARE[1]	PRESERVATION	HOLDING TIME	NUMBER OF SAMPLES	TRIP BLANK[1]	DUPLICATE[2]	MS/MSD[3]	TOTAL NUMBER OF SAMPLES[4]
FIELD LABORATORY ANALYSES									
Carbon Dioxide (CO_2)	Hach Test Kit No. CA-DT or CHEMetrics Test Kit No. K-1910, K-1920, K-1925	As per test kit instructions	As per test kit instructions	Analyze Immediatley	5	--	5	--	10
Dissolved Oxygen	Hach Test Kit No OX-DT or CHEMetrics Test Kit No K-7501, K-7512	As per test kit instructions	As per test kit instructions	Analyze Immediatley	5	--	5	--	10
Ferrous Iron (Fe^{+2})	Hach Test Kit No. IR-18C	As per test kit instructions	As per test kit instructions	Analyze Immediatley	5	--	5	--	10
Hydrogen Sulfide (H_2S)	Hach Test Kit No. HS-C	As per test kit instructions	As per test kit instructions	Analyze Immediatley	5	--	5	--	10

1 Bottleware requirements may differ in number depending on the requirements of the contracted laboratory.
2 Trip Blank – Quality assurance (QA) sample of analyte-free water originating from the laboratory, taken to the site, and returned with the VOC samples. Collected at a frequency of one trip blank per cooler containing VOC samples per day.
3 Duplicate – A single sample split into equal portions during a single act of sampling. Will be collected at a frequency of 1 duplicate sample for fixed-based laboratory analyses during Step I and II, and all field analyses will be duplicated during Step II.
4 MS/MSD – Matrix Spike/Matrix Spike Duplicate. Additional sample volume supplied to fixed-base laboratory for internal QA/Qulaity Control (QC) checks. Will be collected at a frequency of 20% of samples for VOCs only.
5 Excludes MS/MSD samples.
6 May be collected in 1 x 1L HDPE bottle with other water chemistry parameters..

HCl = hydrochloric acid.
HNO_3 = nitric acid
NaOH = sodium hydroxide.
HDPE = high-density polyethylene plastic.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

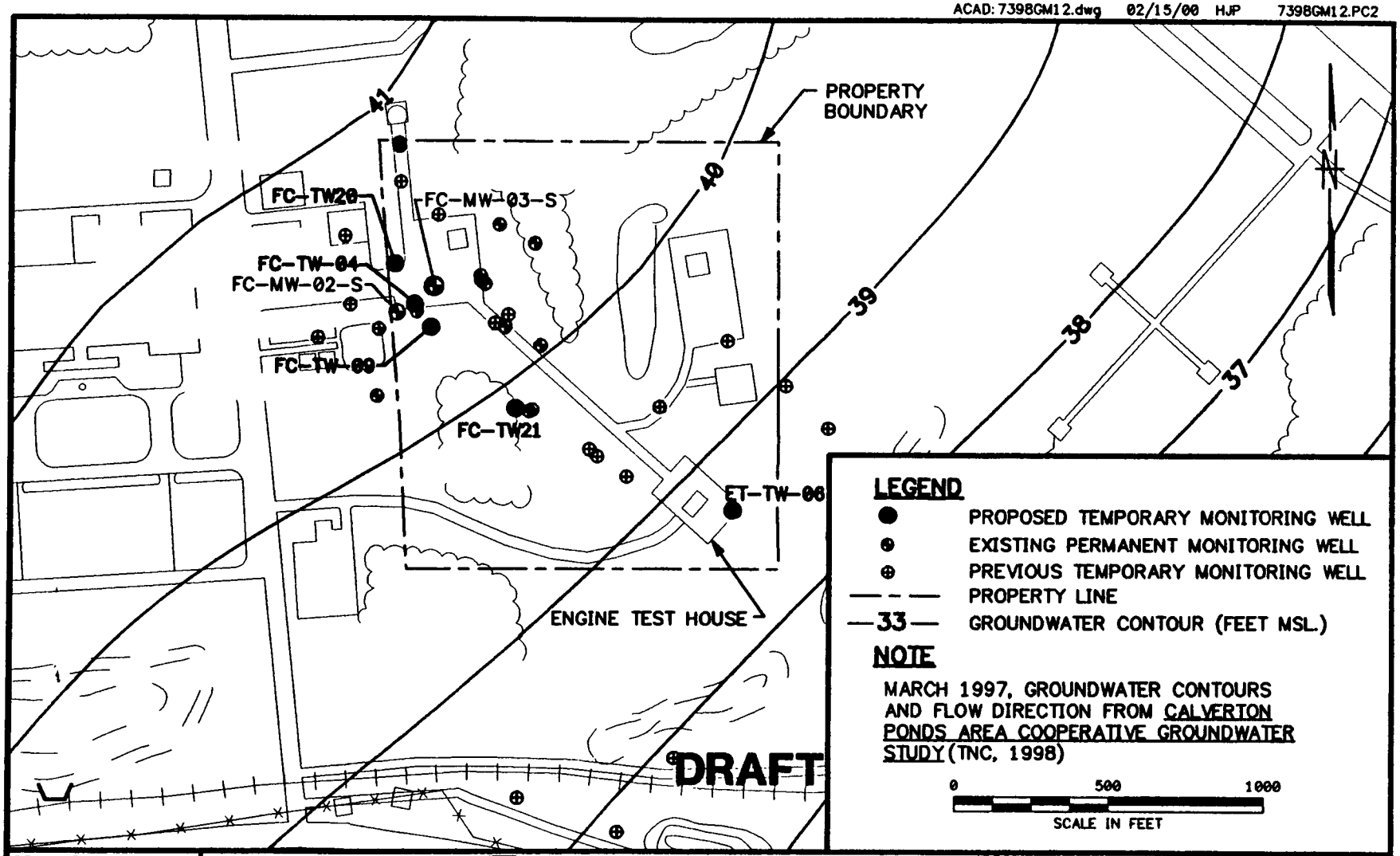
DRAWN BY HJP DATE 1/26/00
CHECKED BY DATE
COST/SCHED—AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

EXISTING AND PROPOSED WELL LOCATIONS
SITE 6A AND SOUTHERN AREA
NWIRP, CALVERTON, NY

CONTRACT NO. 7398
OWNER NO. 0270
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2-1
REV. 0

ACAD: 7398GM12.dwg 02/15/00 HJP 7398GM12.PC2



DRAWN BY HJP DATE 2/15/00	Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY DATE	EXISTING AND PROPOSED MONITORING WELL LOCATIONS SITE 6A NWIRP, CAVERTON, NY	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2-2	REV. 0

FORM CADD NO. T:\NUS_AH.DVG - REV 0 - 1/22/98